MAY 1983
75p

# COMPUTER & VIDEO GAMES



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4D Space/time adventure in fast moving graphics. 48K.
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With speech and Hi Res Graphics. 16K or 48K.
Author: **John Hollis**

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With mutants and Hi Res Graphics. 16K or 48K.
Author: **John Hollis**

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Add speech or music to your programs. 48K.
Author: **John Hollis**

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With 9 levels of minefield. 48K.
Author: **Ian Andrew**

## SOFTWARE FOR THE ZX81 WITH 16K RAM

**QS ASTEROIDS**
"...very good..." "...addictive game!" (C.&V.G.).
Author: **John Hollis**

**QS DEFENDA**
"...better than any other arcade game I've seen." (Sync.).
Author: **Nick Lambert**

**QS SCRAMBLE**
"...amazing, fantastic!" (P.C.W.).
Author: **Dave Edwards**

**QS INVADERS**
"...just like the real thing!" (C.&V.G.).
Author: **Dave Edwards**

**MUNCHEES**
Features 1 to 4 Ghosts, 3 Munchees, Power pills
Author: **A. Laird**

**GALAXIANS & GLOOPS**
Features two types of swooping Galaxian.
Author: **T. Beckwith**

**CROAKA-CRAWLA**
With Frogs, Lorries, Logs, Crocodiles. Turtles, Flies.
Author: **John Field**

## SPECTRUM

**FRENZY**
**Arcade action**
**Features:** Full colour hi-res graphics, sound, high score table, hold feature, 5 levels of robots, Evil Orville the minelayer, exploding pods, progressive difficulty, attract mode.
Author: **David Shea**

**ASTRO BLASTER**
**Arcade action**
**Features:** Full attract mode, 5 attack waves, 15 levels of difficulty, rapid fire, meteor storms, changing aliens, plasma bolts, killer bombs, full colour hi-res graphics, full sound.
Author: **John Edwards**
16K or 48K Spectrum

**EDDIE A WORD PROCESSOR**
**Features:**
Menu driven prompts given at all times. Drastic commands — e.g. Clear Text — are automatically questioned. Load/save commands... all text justified, on screen as well as printer.
Author: **P. Baker**
48K Spectrum

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A trilogy of 16K programs that combine to give an epic 48K graphic adventure. As a galactic trader, you deal with some very bizarre customers indeed.

**STOP PRESS**
Trader now available for the Spectrum £9.95

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**An adventure set in the 19th Century.**
You own and captain a vessel, sail between 5 ports and deal in coal and whisky; with storms, pirates, sea mist and vessels adrift.
Author: **A. Morgan**
ZX81 with 16K RAM

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Fast m/c action, will drive QS sound and character boards, responsive controls, high score tables.
Author: **C. K. Tame**
ZX81 with 16K RAM

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Author: **M. Sudworth**
ZX81 with 16K RAM

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**Arcade action**
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Author: **P. Crane**
ZX81 with 16K RAM

**PIONEER TRAIL**
**A western adventure**
**Features:** 20 levels of play. "Mind Game" plus shooting rifle speed uses all keys and is measured against the players personal average response. This game is based on historical data.
Author: **Marion Stubbs.**
ZX81 with 16K RAM


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# COMPUTER & VIDEO GAMES

# CONTENTS

MAY 1983 Vol II. No 6




## News & Reviews



## Crystal clear . . .

**So you want to get a head? Well there's a chance for everyone to win one on page 24 where we set out our Dark Crystal computer competition.**

**The competition invites you to show your creativity on a computer screen and map out a picture based on the movie.**

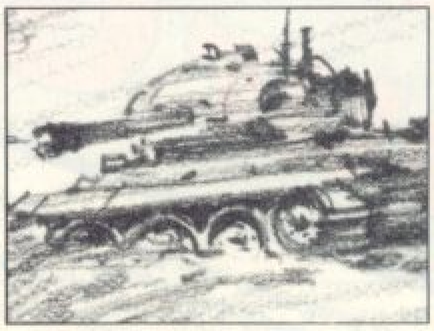
**There's another chance to take advantage of your programming expertise and make your name on television, by entering the BBC's very own young programmer competition.**

**The details are being outlined on the Get Set series on Saturday April 16th, or they can also be found on page five of this issue.**

**And the third competition to be associated with this magazine is on Trevor Truran's Puzzling column where Milton Bradley have put up three of their arcade theme board games as prizes.**

## Listings











## Features



**Editor** Terry Pratt, **Staff Writer** Eugene Lacey, **Editorial Assistant** Clare Edgeley, **Art editor** Linda Freeman, **Production editor** Tim Metcalfe,

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'Ere! What's your GAME?
Turn your programs into gold – with Virgin Games, a new computer software company, part of the Virgin Group and backed by all its resources. Our expertise is in marketing, merchandising and sales – in fact in all the aspects of turning software into cash.
So, we are searching for exciting, entertaining and original programs (from software houses or individual programmers) for the following home computers – Atari, BBC, Commodore 64 and VIC 20, Dragon, ORIC 1, Sinclair ZX Spectrum and Texas Instruments 99/4A.
If you have written a games program with good graphics, lots of action and an original concept and you want to be rich and famous – but you don't have the resources to market it properly yourself – send a cassette copy to Nick Alexander, Virgin Games, 61/63 Portobello Road, London W11. We will evaluate it and if we believe that it has good commercial potential, we will offer you a contract for it.
We are also forming a team of first-class free-lance machine code programmers. If you are interested drop us a line with an example of your work.
When sending us programs to evaluate, make sure that you enclose your name, full address and phone number, operating instructions and details of the computer it runs on. Make sure you keep a copy of the program yourself.
We will only be taking on a limited number of programs so don't delay!
Virgin Games Ltd, 61/63 Portobello Road, London W11. Tel: 01-221 7535.

## NEXT MONTH

Dare you look inside our little black box? It will be waiting to reveal all its mysteries within the pages of the next issue of *Computer and Video Games*. We also challenge you to find the promised land in our epic version of The Ten Commandments.

If that's too heavy for you then how about a day at Royal Ascot.

Home video gaming has really taken off in the U.S. and that craze is surging across the Atlantic.

Two exciting new machines, the Colecovision and the Vectrex will be in our shops by June with the long-awaited Atari 5200 following later.

Eugene Lacey has been keeping you up to date with developments in Video Screens, but in June we are adding a 20 page supplement featuring: reviews, interviews, news of the coming software, full colour pictures of the games on screen and a special competition for three video gamers to win five games cartridges of their choice.

When you've tackled Colecovision's own Zaxxon robot, even home computer gamesters will take note.

# *And there was my copy — all covered in garlic*




In Transylvania you cannot always make it to the newsagents on the right day. Last 16th of the month, I couldn't get out 'till late and my newsagent had put a cross on his door. Well there hadn't been any plagues around (I talk to rats, I know these things) so I guessed he must be keeping my copy of Computer & Video Games.

Sure enough when I flew in the window, I saw my copy all covered in garlic — and it had Haunted House in it too! That's what I get for playing with my VIC all night, instead of terrorising the local peasants.

Anyway I had a little word just under my newsagent's ear and now we get on fine.

Have a word with your newsagent — fill in the form (right).

> To my newsagent: Please deliver/reserve me a copy of Computer and Video Games every month. Price 75p.
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## *LOOKING FOR SCREEN GEMS*

Tune-in to the BBC's Get Set on Saturday April 16th and you will be invited to prove your programming talent.

Those of you who spotted Terry Pratt on the first Get Set on April 2nd will have another chance to see your favourite editor setting out the rules of a competition to find Britain's top young programmer.

If you have developed an original program for your personal microcomputer you should send it in as an entry for the Get Set Computer Program Competition.

All entries must be submitted on a cassette — save the program twice to help avoid loading difficulties. Make sure your full name, age, address and telephone number if you have one, are clearly printed on the cassette and on any documentation you send with it.

Post your entry to: Computer Program Competition, Room 5007, BBC Television, New Broadcasting House, Oxford Road, Manchester M60 1SJ. **Not** to *Computer & Video Games*, please!

Your program may then be featured on the Get Set series and you can tune in to see what the opposition is like as well. The rules are laid out below, so rush your entries in before the June 17th closing date.

RULES

1. The competition is open to all children residing in the UK who are under 16 years on July 1st 1983.
2. You may enter as many programs as you like but they must be your own original work and not copies of any other program.
3. The programs can be for any personal microcomputer currently available in Britain and should be submitted on cassette. Every effort will be made to load all cassettes submitted but should this prove impossible the judges can accept no liability.
4. Prize winners will be announced on 'Get Set'. Winners will also be notified by post.
5. The judges decision will be final in all matters.

## *SAY GOODBYE TO SUSAN*

This is the issue in which we magazine readers should say goodbye to Susan Cameron.

Susan, who has been with us since long before the first issue hit the newsagents and has personally answered more listing queries than any other living human, is not leaving Herbal Hill.

She moves to a new job on the Marketing and Publicity Department and will still be involved with organising competitions and exhibitions for this magazine and many others.

While we will still see a good deal of Susan around the office, her name will not be appearing on the *C&VG* masthead any more. She will be replaced by Clare Edgeley, and I'm sure Clare will find the *C&VG* readership just as challenging as Susan did.

As a parting note we are offering six of our spare Vulcan Electronics' Hungarian Rings (see Puzzling page) to the six readers who come up with the best thank-you letter for all Susan's contributions over the past 18 months. We will make our selection on May 16th. The judge's decision is final and no relatives of Susan Cameron may enter.

## *CONFESSIONS OF A BUG*

The trouble with being a Bug is that you'll get blamed for everything. Take Logger in the last issue where the end of line 134 was unclear in some copies.

I'm sure we'll get the blame for that, but anyway it should read 56 at the end of that line.

Skyscraper on the Dragon 32 had a problem with line 70. It should read

```
70 Z$=INKEY$:IF BD=0 AND Z$=""THEN 100 ELSE IF Z$="↑" AND RA>O THEN IF PO>64 THEN PRINT@PO,NP$;:PO=PO-32:RA=RA-1
```

# ANIROG SOFTWARE




## XENO II

An E-XPANDE-D screen presentation with superb action packed space thriller, written entirely in machine code with four action packed stages. To destroy the power source of Xeno II, you have to fight off waves of robot attack, plasma bombing by the legions of the outer sanctum and finally attack the power source protected by a force field, continuous bombardment by guardians and blockading by wild whirling suicidal space ships. Truly a game for all arcadians.

JS 16K £7.90

## CAVERN FIGHTER

All M/C version of SCRAMBLE. Lasers, bombs, continuous scoring and sound effects give all the thrills of arcade game. Pilot your space ship through the tortuous tunnels and caverns destroying enemy missile launchers, fuel dumps and airborne fire saucers. Four ships to complete mission. 10 skill levels.

KB/JS Unex. £6

## CRAWLER

All M/C version of Centipede. Homing spiders, mushroom laying fleas and multidirection travel makes this games fast and furious, with 10 skill levels.

JS Unexp. £6

## PHARAOH'S TOMB

Once you enter, the only way out is with the aid of a key which unlocks the mystery of the Pharaoh's tomb. Beware of the mantraps the ancient Egyptians so painstakingly built. One false move and you will meet the same fate as befell other tomb robbers over thousands of years. A multiscreen big graphical adventure with M/C movements.

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## SEVEN PROGRAMS (VOL 1)

Hi-res games for the whole family. Board game Othello plus Bomber, Slalom, Bounce out, Lunar Docker, Memory and Snake.

KB Unexp. £6.00

## DOTMAN

All M/C version of the popular arcade game. Excellent colour graphics and sound effects complete with fruits, tunnels, running and highest score.

KB/JS Unexp. £6

## ZOK'S KINGDOM

Your starcruiser badly damaged in a meteor storm is forced to crash land on the planet ruled by ZOK, a time space generated image of Dracula. You are challenged to a battle of wits and endurance as the battle for survival starts in earnest in this big multi screen graphical adventure in hi-res graphics and M/C movements.

KB/JS 16K £6

## SEVEN PROGRAMS (VOL 2)

Another Hi-res games pack for the family. Graphical Adventure, Goblins Gold, plus Dare Devil, Ghosts, Grand Prix, Breakout, Cobra and Minefield.

KB Unexp. £6.00

## KRAZY KONG

An E-XPANDE-D screen, large graphics, rolling barrels, hammer, fireballs, lifts, handbags and umbrellas as you try to rescue the damsel Kong has abducted. Spectacular collapse of Kong's lair in the fourth screen. Uses all 21K of your expanded Vic for this 100% M/C thriller. Complete with high score table.

KB/JS 16K £7.90

## GALACTIC ABDUCTORS

New arcade game with fully EXPANDED screen. Space hawks are abducting the humanoids and also dropping eggs. A big 16K action packed arcade thriller in 100% machine code, Hi-res graphics and multi skill levels.

JS 16K £7.90

## FROGRUN

Popular arcade game. All machine code with brilliant colour graphics and sound effect. Features include snakes, crocodiles, lady frogs, turtles, cars, lorries and logs.

KB/JS Unexp. £6

## DRACULA

Count Dracula is asleep somewhere in his castle. He rises at midnight and you must find him and drive a stake through his heart before he rises. A multi-screen graphic adventure.

KB 3K £6

## TINY TOT'S SEVEN

Super games pack for younger children with bright colour graphics and sound effects. Everybody's favourite Simon plus Super Snap, O's and X's, Word Jumble, Bomber, Duck Shoot and Mad Drivers.

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## SPECTRUM – VIC 20 – ZX81 DRAGON 32

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Please drop us a line at: Computer and Video Games, EMAP, Durrant House, 8 Herbal Hill, London EC1R 5JB.

## THE WORLD OF PIMANIA

Dear Sir,
I have been playing Pimania and I think I've drawn up a diagram of the system of Pimania! Is the sundial on this planet or is it somewhere in space?

*Barry Jones,*
*Croydon,*
*Surrey.*

**Editor's reply: It is possible that your diagram is complete, but we don't think you have yet passed through the Ultimate Gate of Pi, otherwise, the reality of the location of the Golden Sundial would have been revealed to you.**

**Don't simply travel around the world of Pimania. Talk to the Pi-man and do as many different things as you can think of. Don't be afraid to communicate through your keyboard.**

## BACK WITH THE DEBATE

Dear Sir,
I hope to add to the Spectrum Vs. BBC debate, and hopefully please both sides.

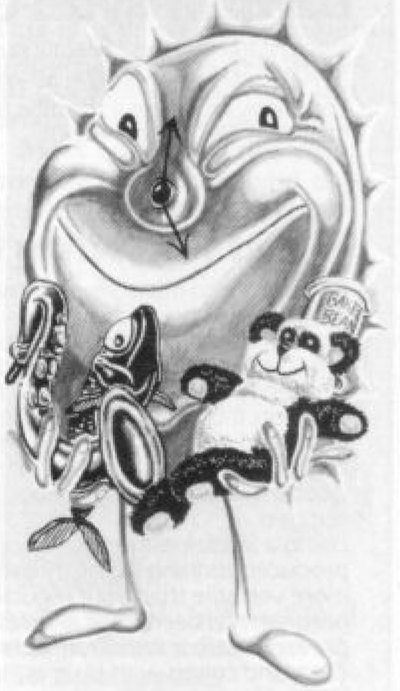
I believe it is silly for Clive Sinclair, or anyone else for that matter to compare the two machines.

They are entirely different machines aiming at different markets, and should be kept so.

I own a Spectrum and have also used my school's BBC, and I was impressed by both machines.

The Spectrum is the world's best home computer for under £200 and the BBC is the best for over £200, and never the twain shall meet.

*M. N. Jackson,*
*Camberley,*
*Surrey.*



## FAMOUS LAST WORDS . . .

Dear Sir,
Hopefully this letter will end the BBC versus Spectrum conflict — which I am sure most people are bored with.

I must agree with many of the points raised by David McKeran in the March issue in comparing the two. However I do not feel that the BBC and the Spectrum can be compared considering the obvious differences between the two machines.

The BBC micro is an excellent machine exceeding the Spectrum in most areas and the buyer is certainly getting his money's worth — but the same can be said of the Spectrum. This is the crunch of the problem. Most people cannot afford a BBC micro. I would certainly like to own the more powerful BBC but have to settle, for the time being, as David McKeran put it, with "the jack-of-all-trades" with which I must add I am completely satisfied!

For all the pros and cons of every computer we should be grateful for the chance we have in this country to be in the forefront of home computing and the opportunity to purchase an exciting and rewarding hobby.

*Stephen Challis,*
*Exmouth,*
*Devon*

**Editor's reply: And with this letter we draw to a close the Spectrum v. BBC debate. 'Nuff said, OK?**

## PRAISE FROM ATARI FAN

Dear Sir,
I have been the proud owner of an Atari 400 computer for over a year now, and have been thrilled with your magazine. Recently we have had some fantastic programs, such as Submarine Hunter, Wordfind, Air Attack and most recently Over the Orchard Wall. Full marks to you and all these authors!

*James L. Campbell,*
*Bramley,*
*Surrey.*

## MORE ON THE ICE VENDOR

Dear Sir,
In your February issue of *Computer and Video Games* a reader complained about a PET/Apple program, Ice Cream Vendor from the November issue.

I was surprised to see that you didn't correct him. Deleting the "VTAB 10" could not possibly work the way it was meant to, because "VTAB 10" on the Apple means (as far as I know) slip 10 lines. So that the Pet version should read: 10 PRINT"/then cursor down/ten cursor right/***

*Njal Fisketjøon*
*Stavanger,*
*Norway.*

## DISAPPOINTED BYGORILLA...

Dear Sir,
I am writing about the C TECH Krazy Kong. When my copy finally arrived — after a month of waiting — I was shocked. The game I got was either terribly bug ridden (which I doubt) or the advert is designed to mislead.

The game is supposed to be for the 16K or the 48K but in actual fact there are two versions. The 16K one is second on the tape and takes about 15 minutes to load because you must run through the 48K version first.

The game is so fast that it is unplayable but only the 48K version has scoring. I was very disappointed and I am going to send it back.

*Iain Reddick,*
*Kirkaldy,*
*Fife.*

## SPRITES KEEP SMOOTH

Dear Sir,
Many thanks for your recent listings for the TI 99/4a computer which show the excellence of this underrated machine.

The ability to have 28 independently programmable SPRITES (smoothly moving graphics characters) and a "transport" colour, allowing characters to move across each other, makes the simulation of arcade games a simple matter in TI extended Basic.

The new Commodore 64 proudly boasts only eight SPRITES, whilst the Atari equivalent "player missiles" are notoriously difficult to program.

Keep up the good work!

*D. A. Johnson,*
*Acklam,*
*Middlesbrough.*

NEW SPECTRUM SOFTWARE

## 48K SPECTRUM
# Super Spy

An exciting espionage adventure in which you follow the villain's trail through complex puzzles, coded messages and 3-D mazes. With different solutions every game Super Spy will keep you entertained for weeks! Full 'save' routine. **£6.50**

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Stake your claim to the Top of the World in this gripping vertical adventure in which you aim to conquer the 29,141' summit of the world's highest peak.
Struggle from base camp to base camp in defiance of all the obstacles which man and nature can throw at you! Survive intense cold as you watch out for avalanches, thin ice and, of course, abominable snowmen! Cope with wayward Sherpas and cross bottomless crevasses but remember to watch your oxygen supply! A game of skill, cunning, bravery and daring for those with a head for heights! **£6.50.**

## 48K SPECTRUM
# Transylvanian Tower

A spine-chilling adventure with spectacular 3-D graphics. Can you rid the world of Count Dracula before he introduces you to the dark world of the living dead? Horror film addicts will know most of the moves, but we've also added a few of our own! Can you discover the mystery of the turret and escape with its treasures?
Enter via the dungeons and work your way up to the terrifying top! Find objects to help you whilst exploring the 500 rooms – all in exciting 3-D detail – but watch out for the bats.
Give your Spectrum a bite of the action now! Includes full save routine for use during the daylight hours! **£6.50**



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## 16K SPECTRUM
# Ship of the Line

An Adventurous Management Game

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**For credit card orders please ring 0628 21107.**

## 48K SPECTRUM
# Ship of the Line

48K version features the chance to send out boarding parties, to build up prize money, to take intelligence tests and to bribe your way up the admiralty ladder! This greatly extended version of Ship of the Line really makes the most of your extra memory. **£6.50**

## 16K ZX81
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Deep Sea Adventure * Bank Account * Underground Adventure * Depthcharge * Hangman * Loan Calculator * Codebreaker * Foreign Currency Calculator. A genuine bargain!

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## 16K ZX81
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## 48K SPECTRUM
# Multi Function Cash Controller

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Cash Controller has four basic functions; it keeps your Bank Account in order, it looks after your Home Budgeting, it calculates loan interest and repayments, and finally it checks your mortgage for you. In addition, it only lets you into the program by means of your own secret password which you personally choose. Once you've allocated budget headings, any transactions you put through the Bank Account will automatically be taken into account on your budgets.
Using a Sinclair printer, hard copy statements can be produced running from any date to any date; much more versatile than your regular bank statement! This program has been carefully crash-proofed to prevent a minor error from scrambling the existing data, and comes with clear on-screen instructions plus full printed notes to help you on your way. Finally, it holds up to 200 bank transactions and fills up most of the memory of your 48K Spectrum. **£10.00**

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| 48K Spectrum | Ship of the Line | at £ 6.50 |
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Send your order immediately to Richard Shepherd Software, Freepost (no stamp required), Maidenhead, Berks. SL6 5BY.



# MAILBAG



## BACK ON THE WARPATH

Dear Sir,
I am having problems with your Warpath program in the Jan/Feb 83 issues of *C&VG*.

I own the following hardware: TRS-80 Model 1, Level 2 and expansion interface, 48K RAM, one TRS-80 5.5 inch mini-disc-drive with TRSDOS, one TRS-80 line printer VII, one CTR-80 cassette recorder.

Under level 2 your program runs without a hitch but I typed it in with Disc Basic 2.2 loaded and it keeps throwing up out of memory in 760 or 770 when I run it. I think it is a problem with the poke statements in line 190 that seems to be causing the trouble.

Can you please advise me if and how the program can be run under Disc Basic as I would prefer to save my programs on disc instead of tape and the disc manual isn't very informative on changing level 2 to Disc Basic.

I've tried everything I can think of but with no results, I've found that the clear 100 statement at the beginning of 760 and 770 are the problem.

I would appreciate any help you can give me in getting this program to run.
*R. J. Evans,*
*Brize Norton,*
*Oxfordshire.*

**Ron Potkin replies: You are right. Line 190 is a way to set the memory size so that you do not have to remember the number each time you run the program. You will see that it is set to 27300 to protect the BIGSCREEN, IBOARD etc, but Disc Basic loads the program starting from location 28672.**

**This means that there is no memory available and an "Out of Memory" error is encountered in line 770. Ideally the program should be written in such a manner that it will run wherever it is located, but unfortunately shortage of memory made it impossible.**

**You should make the adjustments shown right. The effect is to move the program 16384 bytes up in memory. Please be careful with line 860. Part 2 requires a RETURN but the coding following the remark must be introduced for part 3.**

**It is worth noting why the changes are necessary: You cannot POKE 16526/7 to denote the machine language address in Disc Basic. The DEFUSR command must be used. This is a great improvement because now we can define all the addresses when the program is initialised.**

**Most addresses are now greater than 32768 and they must be adjusted by deducting 65536 before they**



**can be poked. In line 770, I have defined a function which makes this calculation.**

**Some addresses are within the machine language routines and the DATA must be adjusted.**

**The coding below up to line 1160 is all that is required to adjust Warpath. However, the DATA only covers parts 1 to 5. There is some more machine language to come and I shall include these changes at a future date.**

```
Warpath - Upgrade to Disk Basic
760 CLEAR100:P=-21852:U=16561:GOSUB190
770 CLEAR100:CLS:DEFINTB,I-V,X-Z:DEFSTRA,C-H:DEFDBLW:RANDOM:DEFFNQ(R!
190 R=PAND255:POKEU,R:POKEU+1,-256*(P<0)+(P-R)/256:RETURN
390 SP=USR1(ML+0):RETURN
420 SP=USR1(ML+0):RETURN
440 X=FNQ(PEEK(VARPTR(X$(V))+2)*256+PEEK(VARPTR(X$(V))+1)):RETURN
450 NX=USR4(BL):IFPEEK(S9)<>255THEN520ELSENX=0:RETURN
)=CINT(R!+65536*(R!>32767))
860 RETURN  'K=1:I=1:R3=2  'DELETE RETURN AND ' IN PART3
980 RESTORE:L=FNQ(&HAB98):FORI=1TO12:READK:GOSUB90:L=L+2:NEXT
990 L=FNQ(&HAB8C):FORI=1TO6:READVF(I):K=VF(I):GOSUB90:L=L+2:NEXT
1100
N9=FNQ(&HAC35):BD=FNQ(&HBBB5):S9=FNQ(&HBF5D):RW=S9+1:RU=RW+12:SK=FNQ
(&HAB8B):SS=SK-5:SB=SK-9:TB=FNQ(&HAAD0)
1130 V=16:GOSUB440:DEFUSR7=X:POKEI,195:U=I+1:P=X+9:GOSUB190:I=I+3
1140 V=1:GOSUB440:DEFUSR1=X:U=X+196:P=RU:GOSUB190:U=U+22:GOSUB190
1150 V=4:GOSUB440:DEFUSR4=X:U=X+36:P=S9+1:GOSUB190
1160 V=3:GOSUB440:DEFUSR3=X:K9=USR3(0)
2500 'DELETE THIS LINE
3007 DATA FD,E5,D1,E1,7C,E6,0F,67,C1,E5,D5,21,35,AC,19,EB
3018 DATA 21,17,AC,11,18,AC,01,28,13,36,80,ED,B0,21,B5,BB
3019 DATA 11,B6,BB,0E,63,36,63,ED,B0,21,F9,BE,11,FA,BE,0E
3020 DATA 63,36,63,ED,B0,21,29,BC,06,1E,C5,06,08,36,63,23
4005 CS$="....21611 3810 5825"
```

## LETTER FROM AMERICA?

Dear Gentlepeople,
I'm in London on vacation (holiday?) and picked up your magazine out of curiosity as to what was available in programs over here. Although I found it very informative and of generally high quality, what prompted me to write was your answer to J. Mansfield (March 83, page 9) and some data of which you might not be aware.

I've owned an Apple II now for about three years. In the owner's manual they describe something called a "Eurapple" conversion. As I recall, all it involved was shorting together two pads on one of the circuit boards to convert the machine to 50Hz.

The power supply which was standard when I made my purchase is usable with both 110V ac and 220V ac without the need for a voltage transformer.

The Apple, therefore, can be powered either here or there without costly hardware, or even very much effort.

As to the output, well, the Apple is designed to drive a monitor. To enable it to drive a TV set requires the installation of an RF modulator. Mine was about $45 when I bought it in 1980 (roughly £30 at today's rate). I can't speak as an authority here, but it seems to me that all one would need to drive a British set is a different value choke.

Obviously, everything I've said applies only to the Apple, and I am speaking from memory — my Apple owner's manual is about six feet from my typewriter and my typewriter is 8,000 miles away! — but I'm reasonably sure that the facts are as I've stated them.

And, given the reputation of the companies that have recently introduced microcomputers at home (eg DEC and IBM), I would be amazed if there weren't others similarly equipped.

So I'd advise looking around a little. It may not be as hard to find a machine that will work both in Europe and America as it at first appears.
*Dan Miller,*
*San Leandro,*
*California,*
*USA*

## DON'T DROP THE ATOM!

Dear Sir,
Until now, *Computer and Video Games* has always had an Acorn Atom program, most of which I have enjoyed, but the December issue did not! Therefore as the owner of an Atom I would like to know whether this is going to be a regular occurrence — replacing "older" computers with the latest ones.

Please remember that many people have older computers and don't want to see them pushed into the background by newer ones.

Before I renew my subscription I would like to have an idea if I am going to be paying for other programs and not have one for my Atom — although I have modified some others for it.
*M. Morrison,*
*Aberdeen,*
*Scotland.*

**Editor's reply: As you have noticed, Mr Morrison, the micro market is becoming very crowded. Current limitations on space for program listings in our magazine will mean that a computer will have to be dropped from time to time. However we do plan to continue to support the Atom, with listings, news and reviews.**

# A NEW SERIES FOR FIRST TIME USERS




**"Learning to Use"** is a new series of books which introduces newcomers to the most widely used micros in the marketplace.

The books assume absolutely no knowledge about computers and the reader is shown even the most fundamental operations such as "switching on" and "loading a program". The books lead the reader through simple programming and then on to graphics, with several programs which show how to achieve pictures and even animation!

The user-friendly approach is consistent throughout the text – not only are program listings clearly shown, but in many cases, a photograph is included to show what the program looks like when actually loaded and run!

All books in the series are £5.95 (incl. postage).

**Gower**

## *To be published April–June 1983*

*Learning to Use the Oric 1 Computer (April)*
*Learning to Use the Commodore 64 Computer (May)*
*Learning to Use the Lynx Computer (June)*

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CVG5B

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# spectrum

# NEWS from SPECTRUM

## BBC

Now from **SPECTRUM** the outstanding **BBC 'B'** machine plus, Disk Drives & software see ad. opposite for details.

## ATARI 800

This **proven and tested** micro is now **UPGRADED TO 48K RAM** and there's **no increase in price either** which must, make it **about the best value around.** See our ad. for further details.

## VISCOUNT DISK DRIVES

**Coming soon!** a fabulous new range of Disk Drives specially selected by **SPECTRUM** from under **£200** too! suitable for most micros inc. LYNX, COL. GENIE, DRAGON etc Ask your local **SPECTRUM** dealer for further details.

## NEW SPECTRUM MEMBERS

Check our address page! - there are many new **SPECTRUM** dealers throughout the UK so there's a good chance there'll be a **SPECTRUM** centre near you.

## INTRODUCING SPECTRUM FACTS!

Next to many of our offers, you'll find a few lines tagged **SPECTRUM FACTS.** We pride ourselves on providing you, the customer, with a **genuine service** as well as **super LOW prices,** and we want you to know that when you buy from a **SPECTRUM** dealer, you'll get **exactly the right micro for your needs. SO LOOK OUT FOR YOUR SPECTRUM FACTS!**

## AFTER SALES CARE

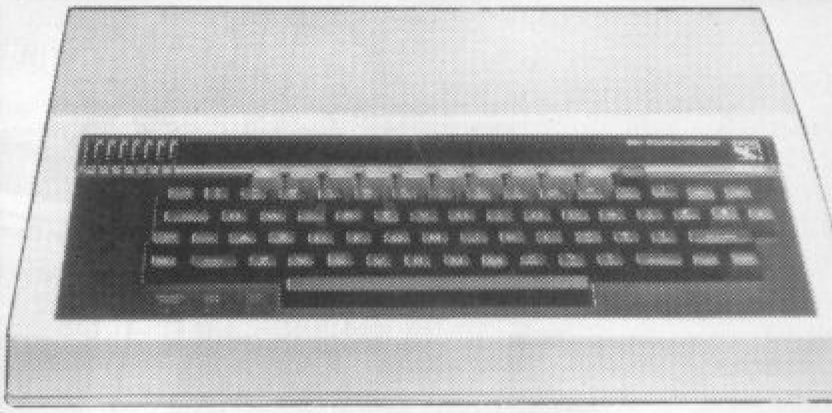
**SPECTRUM** service centres will ensure that should your machine 'go down' **we will get it running again as quickly as possible.** We also offer **extended warranties** at reasonable prices too! - ask your **SPECTRUM HOME COMPUTER CENTRE** for full details.

## COMPUTER DEALERS

(or prospective Computer dealers!) If you would like to know more about becoming a **SPECTRUM APPOINTED DEALER** on an exclusive area basis, please write to **MIKE STERN, Spectrum (UK) Ltd., Burrowfield, Welwyn Garden City, Herts.**

## Now from your local Spectrum dealer - the famous

# BBC Model 'B' MICRO



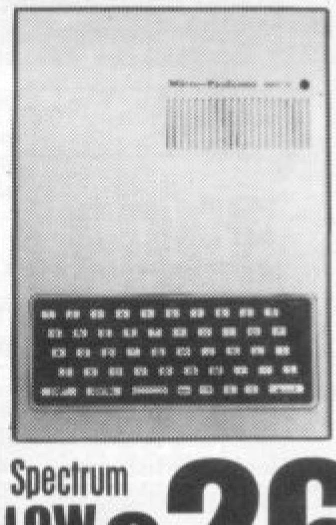
Yes, this **top selling Micro system** is now available from your local **SPECTRUM** dealer -the **BBC Model'B'** offering **32K RAM** plus a **full back-up** of **peripherals & software** too! It's an **infinitely expandable** machine, ideal for the **home or business** and is already widely used for **educational purposes in schools** -so the chances are **your** children may already be **well familiar with its operation,** which must make it the **ideal choice** for the **home** too! So if you're thinking of buying a micro you **must** take a look at the **BBC** at your local **SPECTRUM** dealer **NOW!** - but just one word of warning, initially stocks will be limited and **demand is bound to be great,** so please 'phone to check the stock position before making a journey.

| | |
|---|---|
| BBC 'B' with Disk Interface | £470.50 |
| BBC Disk Interface Kit | £95.00 |
| BBC Single Disk Drive 100K | £265.00 |
| BBC Dual Disk Drive 800K | £803.85 |
| BBC Tape Recorder | £29.90 |
| BBC Acorn Software Cassette based from | £9.95 |
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## Spectrum LOW Price £399.00 INC. VAT

BBC Peripherals & software in short supply - Please telephone before making a journey

# MICRO PROFESSOR

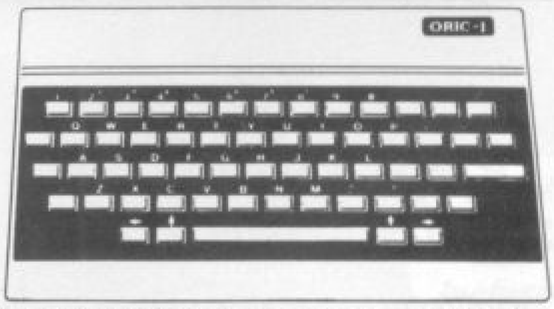


Another **super new** machine from the east - the **superb MICRO PROFESSOR MPF-11. An extremely versatile** personal computer with **Apple compatability 64K RAM & 16K ROM** (includes 12K for BASIC) **6 Colours & full sound** and can run on **most existing Apple software.** For **Home, Business, Education** or **Games** use - it's **unbeatable value!** So if you've always wanted an Apple but couldn't afford one take a look at the **MICRO PROFESSOR** at **SPECTRUM NOW!** it's **incredible value for money.**

## Spectrum LOW Price £269.00 Inc. VAT

Optional full size 55 key, keyboard **£36.25**
Joysticks ........................................ **£14.95**
Wide range of software available

# ORIC-1



A superbly designed and engineered micro and great value-for-money from **SPECTRUM.** Offering **48K RAM Colour** - (8 foreground and 8 background can be displayed at same time) **High resolution graphics User definable Graphics. Full sound** (6 octaves of controllable sound) **Easy to use keyboard with moving keys. Standard Centronics parallel interface allows** easy connection to a wide range of printers etc

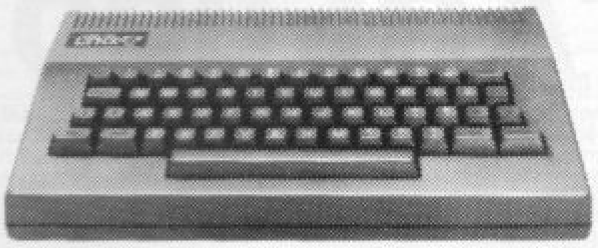
## Spectrum LOW Price £169.95 Inc. VAT

**SPECTRUM FACTS**

| | |
|---|---|
| Maximum user RAM | 47,870 Bytes |
| Text screen | 28x40 |
| High Resolution | 240x200 |
| Cassette Lead | Included |

Not all stores carry every advertised item, please phone before making a journey — Prices correct at time of going to press E. & O.E.

# The powerful and infinitely expandable LYNX



Just look at this **super new LYNX Micro - an incredible** 16K & 32K video ram and that's expandable up to or beyond 96K. For just **£225.00 INCLUDING VAT** the **LYNX is exceptionally versatile.** All **LYNX's** 'add-on' connections are **standard types.** The high definition **colour graphics** make it a **top value choice** for the **home or office** (with expansion, the **LYNX** can become an 80 characters-per-line word processor!) Take a look at the **LYNX** - a memorable bargain from **SPECTRUM.** But please phone to check stock position before making a journey as this machine is bound to be in **great demand.**

## Spectrum LOW Price

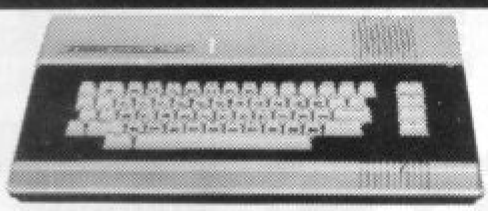
# £225.00 Inc. VAT

VISCOUNT - Teach yourself LYNX BASIC **£6.95**

### SPECTRUM FACTS

Maximum user RAM ..... 13,700 Bytes (approx)
Text Screen .............................. 24x30
High Resolution ...................... 265x248
Cassette Lead ........................ Included

## COLOUR GENIE



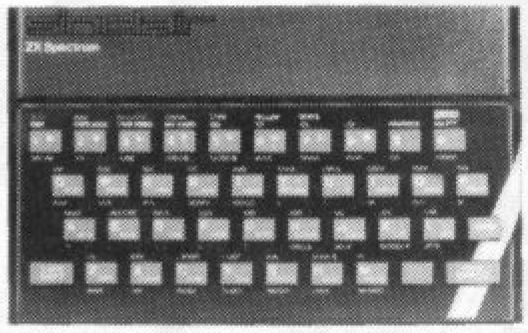
A truly reliable micro and highly recommended by **SPECTRUM** featuring powerful and sophisticated COLOUR GRAPHICS, allowing you to create full 8-colour Games, Diagrams and charts quickly and simply. Powerful 16KK RAM memory (expandable internally to 32K) for FULL COLOUR video games and POWERFUL COMPUTING with a full range of inexpensive accessories: 16K RAM pack, Joysticks for TV games, Light Pen, Disk Drive and a Printer. The superb Colour Genie is at SPECTRUM now - check it out and see the Genius at work!

**Spectrum LOW Price £224.48 Inc. VAT**

**COLOUR GENIE ACCESSORIES**
Joysticks ........................................ £49.49
16K RAM ......................................... £38.50
Printer Interface ............................. £39.95
VISCOUNT Teach yourself Colour Genie Basic ........................................ £6.95

**SPECTRUM FACTS**
**Maximum user RAM ............... 14,200 Bytes (approx)**
**Text screen ........................................ 24x40**
**High Resolution ................................ 160x90**
**Cassette Lead .................................. Included**

# SINCLAIR ZX SPECTRUM



Yes, this top selling micro is now available from Spectrum in both **16K** and **48K RAM**. So now there's no need to send by Mail Order - just call into your local SPECTRUM dealer and pick one up. But just one word of warning: with this added avilability advantage, stocks are bound to sell fast - so make it soon!

**SINCLAIR ZX SPECTRUM 16K - £125.00**
**SINCLAIR ZX SPECTRUM 48K - £175.00**

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

## SINCLAIR ZX-81



**SINCLAIR ZX . . . £49.95**
**16K RAM pack . . £29.95**
**ZX Printer . . . . £59.95**

| Computer Bookshop Software for Sinclair Computers | INC. VAT |
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| Bumper 7 1K ZX81 | £5.95 |
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| Fantasy Games | £4.75 |
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| **Type—30** | |
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| Backgammon | £5.95 |
| Flight Simulation | £5.95 |
| **Type—50** | |
| English Literature 1 | £6.95 |
| English Literature 2 | £6.95 |
| Geography | £6.95 |
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**ZX-PANDA**
**16K RAM PACK**
**ONLY £24.95**

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Now from **SPECTRUM** - this **top selling** range of printers **renowned throughout the world for their quality and reliability.** If you're thinking of adding a printer to your micro then you must take a look at the **MICROLINE** range at **SPECTRUM -NOW!** they're **fantastic value-for-money** especially at our **SUPER LOW prices**

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## BOOKS



| SELECTION FROM THE COMPUTER BOOKSHOP | |
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| 30 Hour Basic for the BBC Micro | £5.95 |
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| BBC Micro Revealed | £7.95 |
| Over the Spectrum | £6.95 |
| 60 Games and Applications for the ZX Spectrum | £4.95 |
| Programming the 6502 | £9.95 |
| Programming your ZX Spectrum | £6.95 |
| ZAP Pow Boom for the Vic 20 | £7.95 |
| The ZX Spectrum Explored | £5.95 |
| Vic Inovative Computing | £6.95 |
| Mastering Machine Code on your Zx81 | £7.50 |
| The ZX Spectrum and how to get the most from it | £5.95 |
| Easy Programming for the ZX Spectrum | £5.95 |
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| CPM Handbook | £11.50 |
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| 20 Best Programmes for the ZX Spectrum | £5.95 |
| Getting aquainted with your Vic 20 | £6.95 |
| Machine code and Better Basic | £7.50 |
| The Cambridge Colour Collection (Spectrum) | £6.95 |
| Vic Revealed | £10.00 |
| De RE Atari | £17.00 |
| ATARI Operating system listing | £10.43 |

**MORE SPECTRUM LOW PRICES!**

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# spectrum

## A few examples from our SOFTWARE Selection from independent software houses

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| Submarine Commander | £34.44 |
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| Kickback | £29.84 |
| Home Financial Management | £19.49 |
| Darts | £19.49 |
| Snooker & Billiards | £19.49 |
| Pool | £19.49 |
| Cribbage & Dominoes | £19.49 |
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| Mutant Herd | £24.25 |
| Software for Commodore | |
| River Rescue | £25.24 |
| Vic Music Composer | £25.24 |
| Dune Buggy | £4.99 |
| Super Worm | £4.99 |
| Jungle | £4.99 |
| Cosmic Battle | £4.99 |
| Frogger(3K) | £4.99 |
| Rabbit Functions | £4.99 |
| Code Breaker | £4.99 |
| Night Fight (3K) | £4.99 |
| Rabbit Writer (16K Cassette) | £19.99 |
| Rabbit Base (16K Cassette) | £14.99 |
| Myriad (3K) | £9.99 |
| Charset/20 (3K) | £4.99 |
| Skramble | £9.99 |
| Space Phreeks | £9.99 |
| Night Crawler | £9.49 |
| Hopper | £9.99 |
| Tank War | £7.99 |

### GEM

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|---|---|
| Monster Mine (for ZX81) | £4.95 |
| Monster Mine (for Spectrum) | 4.95 |
| Monster Mine (for Dragon) | 7.95 |
| Space Mission (for ZX81) | £4.95 |
| Space Mission (for Spectrum) | £4.95 |
| Space Mission (for Dragon) | £7.95 |
| Dragon Golf | £7.95 |
| Dragon Character Generator | £9.95 |

### SALAMANDER

| Games for Dragon 32 | Inc. VAT |
|---|---|
| Dragon Trek | £9.95 |
| Wizard War | £7.95 |
| Vulcan 0 | £7.95 |
| Games Compendium DI | £7.95 |
| Golf | £7.95 |

### RABBIT

| Software for Commodore VIC20 | Inc. VAT |
|---|---|
| Space Storm | £6.99 |
| Ski Run | £4.99 |

### KUMA

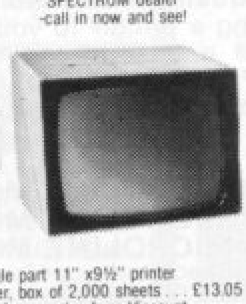
| Software for Sharp | |
|---|---|
| Electron 22622 | £9.20 |
| Cribbage | £12.08 |
| Adventure | £12.08 |
| Chess | £16.68 |

### AUDIOGENIC

| Programs for VIC-20 | Inc.VAT |
|---|---|
| Amok | £6.95 |
| Alien Blitz | £7.95 |
| Golf | £7.95 |
| Spiders of Mars | £19.95 |
| Sattelite & Meteorites | £19.95 |
| Bonzo | £7.95 |
| Trashman | £19.95 |
| Boss | £14.95 |
| Tank Attack | £19.95 |
| Word Craft Word Processing package | £125.00 |

Plus many more at your local SPECTRUM dealer -call in now and see!

## ACCESSORIES



**SANYO Colour Monitor CDD3125N £228.85**

| SANYO | Inc. VAT |
|---|---|
| SANYO 12" green monitor | £90.85 |
| Slim 3G Cassette Recorder | £29.95 |
| C12 Cassettes | £0.50 |
| Single sided double density disks (Box of 10) | £21.25 |
| Double sided, double density disks (Box of 10) | £33.81 |
| Disk head cleaner | £16.10 |
| Single part 11" x9½" printer paper, box of 2,000 sheets | £13.05 |
| VIC Accessories from Viscount | |
| Motherboard without Buffer | £24.95 |
| Motherboard with Buffer | £29.90 |
| 16K RAM Pack | £43.95 |
| 32K RAM Pack | £66.95 |
| 64K RAM Pack | £114.94 |
| Currah ChatterboxVoice Synthesiser | £57.45 |

**Now with 48K RAM and still at the same LOW price!**

# ATARI 800




Now this proven and tested machine has been upgraded to a massive **48K RAM** and its still at the amazing **LOW** price of**£399.99** from **SPECTRUM.** It's an ideal Home Micro for graphics, educational and personal finance etc. use it and it will take you from learning up to a small business use. You can add printers, program recorders, disk drives and more, to expand your micro as and when you want, to suit your needs. So if you're looking for a top of the line micro you must see the **ATARI 800** with **48K** at **SPECTRUM - NOW!**

**Spectrum LOW Price**

**£399.99 INC. V.A.T.**

**SPECTRUM FACTS**

| | |
|---|---|
| Maximum user RAM | 37,899 Bytes |
| Text Screen | 24 × 40 |
| High Resolution | 320 × 192 |
| Cassette Lead | Needs own Recorder |

# ATARI 400

## 16K RAM




**NOW ONLY £159.95 INC. VAT**

BASIC cartridge extra

**£39.99 inc. VAT**

(£34.77 ex. VAT)

**SPECTRUM FACTS**

| | |
|---|---|
| Maximum user RAM | 13,323 Bytes (with basic Cartridge) |
| Text Screen | 24 × 40 |
| High Resolution | 320 × 192 |
| Cassette Lead | Needs own Recorder |

**ATARI DISK DRIVE £299.00 INC. VAT**

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|---|---|
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| | INC VAT |
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VISCOUNT Teach yourself Dragon Basic . £6.95

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**SPECTRUM FACTS**

| | |
|---|---|
| Maximum user RAM | 29,679 Bytes |
| Text Screen | 16x32 |
| High Resolution | 256x192 |
| Cassette Lead | Included |

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**SPECTRUM FACTS**

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| | |
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**Spectrum LOW price £139.90**

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**Very limited supplies of this new micro now available - please check with your local SPECTRUM dealer before making a journey.**

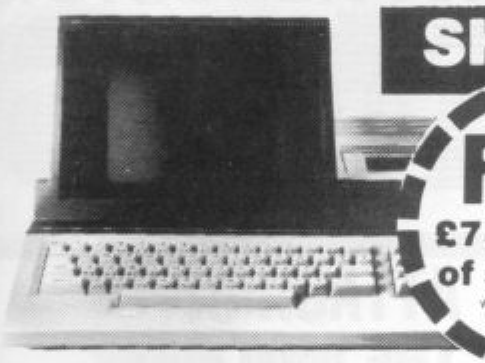
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**Spectrum LOW price £114.94**

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

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| | |
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| | |
|---|---|
| 80 Col Tractor Feed Printer inc. Cable, 1/0 Card & Rom | £477.25 |

**SPECTRUM FACTS**

| | |
|---|---|
| Maximum user RAM | 32,000 Bytes (apx.) |
| Text Screen | 25x40 |
| High Resolution | Not available |

Cassette Lead, Cassette Player Included.

**Spectrum LOW Price £546.25 Inc. VAT**

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**SPECTRUM FACTS**

| | |
|---|---|
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| | |
|---|---|
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Not all stores carry every advertised item, please phone before making a journey — Prices correct at time of going to press E. & O.E.

# NOW YOUNG BLADES GO FOR IT!

## SWORDFIGHT



In days of old when men were bold and problem pages hadn't been invented, men fought to the death for the hand of a fair lady.

Romantic Spectrum owners can now battle it out for the favours of the belle of the local computer club with this latest sword fighting simulation.

The game is for two players at the same time using the left and right hand sides of the keyboard.

Comprehensive sword controls enable you to parry, cut, thrust, and move left or right.

When a fight is over — one of the players will either have died or surrendered — the program gives you an action replay to show the vanquished cavalier where he went wrong.

The dual is fought over a limited time. If nobody is killed in this period the match is drawn.

Swordfight at Midnight runs on Sinclair Spectrum in 16 or 48K and costs £4.95 from Firefly Software plus 35 postage.

Firefly is a new software house set up by four sixth-formers from Foxley Lane, Binfield, Berkshire.

# AUTOMATA'S GREATEST 1K HITS!

## BEST TASTE

Best Possible Taste is the latest release from the authors of Pimania — the game with the £6,000 prize.

It is a compilation of some of Automata's best known 1K ZX81 games featuring classics like Noah's Ark, Lies, Reagan, Merry Xmas, Royal Flash.

Thirty games in total are featured on this cassette, all for £5.

Pimania fans will also be pleased to learn that a sequel is currently under development.

The prize will be a trip to America for two and a meeting with a mystery Hollywood star whose name is hidden somewhere in the game. The person who discovers the identity of the mystery star will be the lucky winner.

Curiously titled My Name is Uncle Groucho, You Win a Fat Cigar, the game will be available towards the end of May.

# YOU'LL GO APE OVER KONG . . .

## CRAZY KONG

Cripes! The gorilla's got my goil! What am I gonna do now? He's taken her to the top of the steel fortress!

Pull yourself together you chicken-hearted carpenter. Put down your tools and get up there and rescue your sweetheart!

This little domestic tale is familiar to all arcadesters and a few pubsters too now it can now be witnessed on the screen of your Vic-20.

This latest game from Interceptor Micros takes some of the action from the three screen arcade version of Donkey Kong and puts it all together in a one screen compilation.

Crazy Kong comes complete in a video film style cassette holder and is available from the Hampshire-based firm at £6.

Also new from Interceptor this month is a shoot 'em up space game with a weird and wonderful assortment of aliens called Fantazia, also available at £6.

# FAST FOOD FOR HUNGRY MAZE FANS

## GOBBLERS

If you are hungry for a new Atari game then Gobblers and Goblins may be just the game to satisfy your appetite.

Bananas, cherries, hamburgers and milk-shakes are all presented for consumption by your little gobbler, controlled with a joystick.

A constantly changing maze is created by the appearance of the goblins whom you must avoid at all costs.

If you inadvertently eat one of these goblins you will drop dead on the spot and an ambulance will appear to carry you off screen.

Gobblers and Goblins is the latest game from Allrian software of Hayes.

It runs on the Atari 400 and 800 in 16k and is available from the Middlesex-based firm at £15.50 for cassette, and £18.95 on disc.

# ATTACK OF THE MUTANT WHAT?

## CAMELS

This year's prize for the computer game with the zaniest name has got to go to Llamasoft's new Commodore 64 game Attack of the Mutant Camels.

Cunning aliens, having observed the disasterous attempts of fleets of spaceships to invade Earth, have hatched a more devious plot.

Those normally docile desert beasts, — camels, have been transformed by genetic engineering into 90 foot high, laser spitting, neutronium shielded Death Camels.

Your mission is to rid the desert of these mutants before they build up sufficient numbers to take over the world.

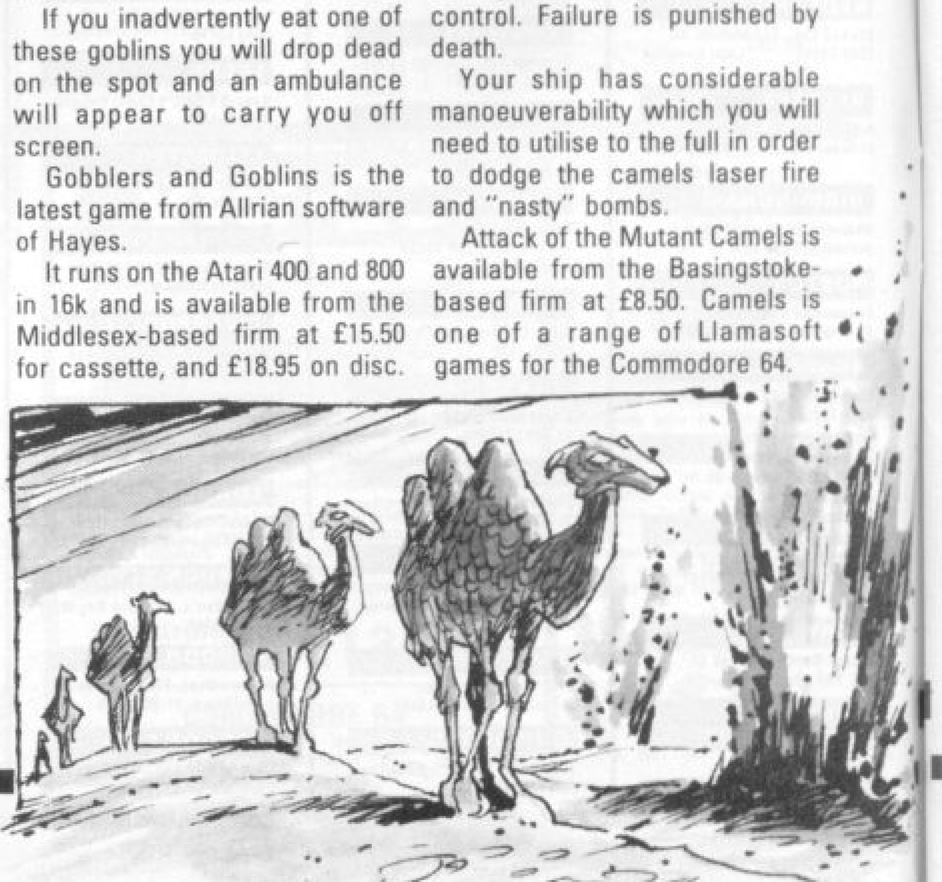
You are armed with a powerful cannon and the long range scanners show you the whereabouts of the camels.

Despite your heavy fire-power you will have to score several direct hits on the camels neutronium shields before they are imobilised. Once this has been achieved you can move in for the kill.

But you'd better be quick, for if any of the camels manage to march to the extreme right of your scanner Earth base will blow your ship to bits by remote control. Failure is punished by death.

Your ship has considerable manoeuverability which you will need to utilise to the full in order to dodge the camels laser fire and "nasty" bombs.

Attack of the Mutant Camels is available from the Basingstoke-based firm at £8.50. Camels is one of a range of Llamasoft games for the Commodore 64.



Illustrations: Jon Davis

# GAMES NEWS

## STICKING WITH THE WINNERS

### QIX

Atari are continuing their policy of launching tried and tested arcade games for the 400 and 800 machines. This months releases include copies of the two hit games QIX and Donkey Kong.

Donkey Kong with the crazy gorilla, blond starlet, and Mad Mario the carpenter needs no introduction to arcadesters.

Slightly less well known but no less a good game for it is QIX, which was first featured at C&VG's Arcade Champ of the Year last summer. The idea of the game is to capture as much space as possible by drawing shapes on the screen.

Press the fire button to draw and move your marker around the screen avoiding the QIX — a large spark.

When you have filled in 75% of the screen you can move on to the next one or, for really high scores, you can fill in up to 90%. These games are available from your Atari dealer at £29.95.

Other new cartridges for the Atari computers are about to be launched by the English Software Company.

These will be available in May and will feature a new version of Airstrike — the scrolling shoot-out. Airstrike 11 and Venus Voyager are being manufactured in the U.S., although the programming was completed in the U.K. The games will be available in May but no information on price is yet available.

## THINGS THAT GO BUMP IN THE MAZE!

### MONSTERS

Ghouls, monsters, vampires and a Mad Monk are all featured in this latest Hitchcock style game for the Sinclair Spectrum.

Incorporating some elements of the arcade game Dig-Dug the game challenges you to escape from a maze of corridors and connecting step ladders and adds some original twists of its own.

You are armed with a magic hammer which enables you to dig holes in the corridors for the monsters that are in hot pursuit to fall into.

Just to give this version its own original twist the monsters are vampire monsters and the setting is hell with the flames burning away beneath you.

You are also only allowed a limited amount of holy power so you have to use your hammer sparingly. Watch out for the Mad Monk and his Ghouls — they are also out to get you.

Monsters in Hell runs on the Sinclair Spectrum in 16 or 48K and is available from London-based Softek at £5.95.

Also new from Softek this month is a version of the popular arcade game Centipede and a deep space shoot 'em up game called Firebirds. These are also available at £5.95 from Softek.

## GET YOUR TEETH INTO THIS ONE!

### MOLAR MAUL

If you think that using your TV set to play computer games provides an escape from those toothpaste advertisements that keep reminding you of your dental appointment then Molar Maul will put an end to all that!

This new game allows you to take part in the fight against the DK's who are trying to destroy your teeth.

The tooth wreckers come in the apparently harmless guise of Jelly Babies and toffees but, as every dentist will tell you, they can do irreparable damage to your gnashers.

To fight the good fight you are armed with a toothbrush and a tube of Imagico toothpaste.

Move the brush around the mouth which is displayed on the screen using your keyboard controls. Every so often you will need to go to the tube of toothpaste to recharge your brush.

It becomes increasingly difficult to brush away the DK's as the game gets faster and faster.

Molar Maul runs on a Sinclair Spectrum in 16 or 48k and is the latest release from Imagine Software of Liverpool.



Also new from Imagine this month is a Vic game called Frantic. You are a robot on a mission to mine the precious mineral hidden at the bottom of a deep trench. Your jet pack enables you to fly through the obstacles that will confront such as attacking aliens and uncertain terrain.

Imagine games are available from the Liverpool based firm at £5.50.

## FLIGHT OF FANCY IN THE STARS

### STARSHIP

Starship Command adds a number of extra flight controls for your Starship as you hurtle through space zapping the aliens.

Your ship can accelerate, decelerate, rotate and fire torpedoes. There is a shield which you can activate to protect your ship from enemy fire and two escape capsules either of which can be launched before your energy banks are drained empty.

On the right of your screen your long and short range scanners show the whereabouts of the alien ships.

Just like Atari Star Raiders you have only a limited amount of fuel to complete your mission and this is eroded each time you fire torpedoes, accelerate to decelerate, use your shields or sustain a direct hit from an alien ship.

At the end of your mission you get an assessment from the Starship Commanders and depending on your performance you will be given another more difficult mission to carry out.

Starship Command runs on the BBC model B and costs £9.95 inclusive from Acornsoft of Cambridge.

Also new from Acornsoft this month is a snooker simulation game which lets you become Steve Davis for an afternoon.

The length of the cue you select determines the strength of the shot. You can also instruct the computer to use backspin, topspin for those special trick shots.

Normal snooker rules apply including foul shots and snookers. The only thing this snooker game lacks is a £10,000 jackpot! Snooker runs on a model B at £9.95 inclusive.

## CLASSICS FOR THE ORIC OWNER . . .

### AWARI

Two classic games have found their way on to an Oric format to start off the software libraries for owners of this new computer.

Awari, the African pebble game, is reproduced on cassete for £5.50 and Othello should also prove popular at £6.50.

The tapes come from a new software house, run by the Tangerine User Group's Bob Green. It is called Kenema Associates Limited and is based at Worle in Avon.

Two other cassettes are also being released by Kenema for Oric owners: Keytrainer is aimed at giving 6-12 year olds a familiarity with the machine's keyboard, while the Character Design Aid enabling beginners to make good use of the Oric's user definable graphics facility. Both these cassettes cost £5.50 each.

# GAMES NEWS

## OUT COME THE FISHY FREAKS!

### SEVEN SEAS

Thorn EMI's latest game has a conservation theme — it contains a warning about the dangers of dumping toxic nuclear waste in the sea.

The guaranteed "safe" canisters have started leaking radioactive substances into the ocean currents.

The creatures of the deep have been transformed into crazed mutant monsters out to take revenge on mankind.

As the captain of a submarine your task is to journey to the bottom of the sea and collect the canisters. Then you have to transport them back to the surface for processing.

But watch out for giant octopi who are hooked on the stuff in the canisters!

Save the Seven Seas runs on the Atari 400 and 800 and is in the shops now.

Also new for the Atari are a sports simulation game called a Major League Hockey and Orc Attack.

The latter game which challenges you to repel an attack of ferocious Orcs who are attempting to storm your castle.

TI99/4a owners have also been included in Thorn's spring releases with compatible versions of their TV advertised games, Submarine Commander and River Rescue.

New games for the Vic-20 include Mutant Herd in which you must find and destroy mutant eggs which are hatching into giant man-eating insects.

Dodge falling rocks and avoid the insects as you lay your explosive charges to destroy this threat to mankind.

Fourth Encounter — the second of the Vic-20 releases is a classic shoot 'em up space attack game.

You and your laser base against the aliens. The rest is history.

Thorn EMI cartridges will be in the shops in May and will sell at around £30.



Illustration: Jon Davis

## THE FLYING FORTRESS COMES HOME!

### ZAXXON

Zaxxon is widely regarded as representing the "state of the art" in graphics for 3D games.

The blue fortress with its ground-to-air missiles and high flying jet fighter needs no introduction to arcadesters.

It's a superb sight — that Zaxxon screen, with missiles blasting up at you from the fortress floor as you zap over walls and electric defences, judging your height by your shadow.

The game was first converted for the home by Colecovision for use on their video games centre which is shortly to go on sale in the UK.

The good news for home computer owners is that the game has now been converted for the Atari 400 and 800.

The game requires ?K and is available from Calisto Computers of Birmingham at £29.99 on disc or cassette.

Also new from Calisto this month is Astro Chase, the new game from Fernando Herrera — the award winning ex-Atari games writer.

The game challenges you to defend the Earth from an invasion of aliens who have thrown a force field around our galaxy. Once they have launched their attack vessels the chase is on.

Astro Chase also runs on the Atari 400 and 800 in ?K and comes on disc or cassette at £26.50.

## TAKE TO THE AIR FOR A TUTORIAL

### MAP OF UK

Map of UK gives a new meaning to crash courses in geography. It's a game with a strong educational bias for Spectrum owners.

The cassette provides a large scale map of all the United Kingdom plus Eire. The action takes place in an addictive hot-air balloon game, search for a named place, work out the distance between two places, display latitude and longitude and it is also possible to remove names from the map to play "guess the place".

The game comes from Kuma Computers of Maidenhead.

It costs £11.95 and should make geography a lot more fun for those who can follow a course without crashing.

## ROOMS OF DOOM FOR ADVENTURERS

### TOMBS OF KARNAK

There are fifty rooms to be explored if the intrepid Sharp MZ-80K owner is to find his way around the Tombs of Karnak.

This is a classic adventure game where you have to overcome challenges and evil characters in fifty different locations.

The game is available from Solo Software of St Johns in Worcester. It runs on the Sharp MZ-80K and MZ-80 and is available at £7.95.

## ENTER THE WORLD OF THE CRYSTAL

### DARK CRYSTAL

The lost shard of the crystal is the key to a new graphic adventure game based on the new film, The Dark Crystal.

The flawed crystal is being used by ten evil creatures, the Skeksis, to pervert the way the world is run.

They are opposed by 10 gentle creatures, the Mystics, forces for good on the planet.

An ancient prophecy foretells that the Skeksis rule will be broken by Gelfling hand and the crystal made new again. So the Gelflings were wiped out by the Skeksis' deadly agents many years before and only two, Jen and Kira, survive to make the prophecy come true.

The game is produced in America by Sierra On-line and features some marvellous graphic screens.

In the UK, Apple and Atari versions are being distributed by South-London based SBD Software. A Commodore 64 version is also expected to be released over here shortly. The game comes on disc and although prices have yet to be confirmed, it is expected to sell for around £20.

We are running a Dark Crystal graphics competition on page 24.


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# VIDEO SCREEN

## HOT TIME IN THE OLD CASTLE

### DRAGONFIRE

Following Imagic's successful Riddle of the Sphinx Adventure game for the Intellivision machine, which had a clutch of cartridges as a prize for the most intrepid explorer, the American firm has just launched a second Intel Adventure.

Dragonfire turns you into a Prince who has been given the task of ridding the kingdom of the dragons who have taken over the castle. Then you must restore the rightful king to the throne.

In order to do this you must first get inside the castle. Using the joystick controller direct the Prince across the bridge, dodging fireballs and the arrows from an archer positioned high on the castle turrets.

Once inside, head for the treasure room to recapture the king's riches.

Now the battle gets tough. You will have to fight it out with a dragon which has varying strength — depending on which difficulty level you select.

Treasure recovered, the Prince must then cross another bridge and face a tougher dragon. Points are awarded for each item of treasure recaptured.

Dragonfire can be played by one or two players and is available from most Intellivision stockists now at £31.45.

Two other new games for the Intellivison feature a version of Donkey Kong called Beauty and the Beast.

Instead of mad Mario and the gorilla this game introduces Horrible Hank, Tiny Mabel, and Bashful Burford.

You play the part of Burford, who is trying to rescue his girlfriend Mabel, from Horrible Hank who has carried her to the top of a sky scraper.

Also new in the shops is the Intel version of the hit Imagic game Demon Attack.

Demon Attack and Beauty and the Beast are available now from your Intellivision stockist at £31.45.



## LOOK FOR THE GROND

### VANGUARD

Atari's Vanguard is the most original release from the leading video games firm for some time.

This game incorporates several challenging screens.

Like most new games there is a complex story line. You are challenged to fight your way through to the fortress of the evil Grond and destroy him. Not that any of this has anything much to do with the real enjoyment of this game — dodging, and blasting.

The first screen challenges you to shoot your way through a scrolling tunnel. The aliens are coming thick and fast and you will need to utilise your ship's ability to shoot forwards, backwards and up and down to full in order to shoot down enough of them to get through to the next screen.

Screen two provides an interesting twist as you are now scrolling downwards instead of forwards. Your adversaries at this stage are cute ping-pong ball type characters which bounce across the screen and edge slowly down towards you.

A couple of screens further and the aliens are tracking you up screen.

When you are finally approaching the Gronds fortress you are pursued by serpents and snakes that can immobilise you with poisonous bites.

Vanguard has a useful game play feature which allows you to start your next game where you left off if you press for a repeat game before the indicator reaches zero.

The game play is so fast and furious that Vanguard is guaranteed to give you joystick blisters.

The game also incorporates excellent use of the VCS's colour capabilities. Vanguard will be in the shops in May at £9.95.

## BOMBERS GO OFF WITH A BANG!

### ASSAULT, ASTROWAR, SPACE ROBOT

The Bomb has dropped! This new games company is launching a major assault on your Atari VCS and has attacked the UK market with a new game called Assault.

This challenges you to blast wave after wave of aliens with your laser base and it owes a lot to the successful Imagic game, Demon Attack.

The screen displays a mother ship which is moving back and forth across the screen — constantly — just out of range of your laser fire.

In order to get a potshot at the mother ship you will have to first shoot your way through several waves of aliens.

One of the most enjoyable aspects of Assault, and certainly that which gives it its main claim to originality, is the ability to fire left and right as well as up screen. You will need this facility as certain of the aliens drop Grabbers which dart across the bottom of the screen towards your laser base. Deft joystick control and a quick finger on the fire button are required to survive this wave.

One other new VCS manufacturer launching into the UK market for the first time VIA Pancom did not meet with quite as favourable a reaction from our resident Atari expert.

Astrowar from Dimax is a scrolling shoot out which, graphics wise, gives a new meaning to the word basic.

You are challenged to shoot down a belt of meteors that are bombarding your ship. Larger rocks split up making for more difficult targets.

Dotted in and around the meteors are a few sneaking aliens moving at greater speed than the rocks. These must be eliminated at all costs. If they slip past you you are dead.

Slightly more original though still not in the super-game class was Space Robot, also from Dimax.

Not a Berzerk-type game as the title might suggest but a shoot 'em up style game incorporating some of the best elements of Missile Command.

The robots are attacking in threes marching down the screen in neat rows.

You control a gun sight with your joystick which you must position at the centre of a robot. Press the fire button to position a laser blast on the chosen robot.

Assault, Astrowar, and Space Robot are all available at £1.95 from Pancom of Grimsby in compatible PAL format.

| | | |
|---|---|---|
| 1 Pacman | Atari VCS | Atari |
| 2 Frogger | Atari VCS | Parker |
| 3 Defender | Atari VCS | Atari |
| 4 Space Invaders | Atari VCS | Atari |
| 5 Demon Attack | Imagic Atari VCS | Imagic |
| 6 Demon Attack | Imagic Intellivision | Imagic |
| 7 Starmaster | Atari VCS | Activision |
| 8 Pitfall | Atari VCS | Activision |
| 9 Star Raiders | Atari VCS | Atari |
| 10 Empire Strikes Back | Atari VCS | Parker |

Illustrations: Terry Rogers

# VIDEO SCREEN

## SWINGING TIME IN THE JUNGLE

### PITFALL, STAMPEDE



Something is stirring in the jungle — and it's not just the wild beasts. It's Pitfall Harry, the latest video hero.

Harry is the central character of a new game from Activision for the Mattel Intellivision home video system. It features the outstanding audio-visual effects that have become the trademark of the game's creator, award-winner David Crane.

Harry travels through dense jungle and underground passageways in search of gold and silver bars, money bags and diamond rings. Along the way he encounters bottomless tar-pits, deadly snakes, scorpions, fires, crocodile infested lagoons and rolling logs. Pretty tough huh? All this adds up to an exciting and original game.

Activision's second release for the Intellivision is Stampede — a game mentioned within the pages of *C&VG* frequently during past issues. Activision say that this is one of their most popular games — it was created originally for the Atari VCS and introduced in 1982.

The theme is the good old Wild West and you are out rounding up stray cattle — which just happen to be rushing around in a panic sticken state.

You have to direct both horse and rider as you attempt to lasso the stampeding steers. Points pile up as you rope the devious little dogies. Bob Whitehead, who designed Stampede, is also the creator of that other popular game Chopper Command which took the USA by storm.

Pitfall and Stampede should be at your local Activision stockist right now. Pitfall will set you back around £29 and Stampede is slightly cheaper at around £25.

## HYBRID FOR VIDEO AND MICRO FANS

### CREATAVISION

If you can't decide whether to buy a computer or a video games system then the new Creatavision may be the solution you are looking for.

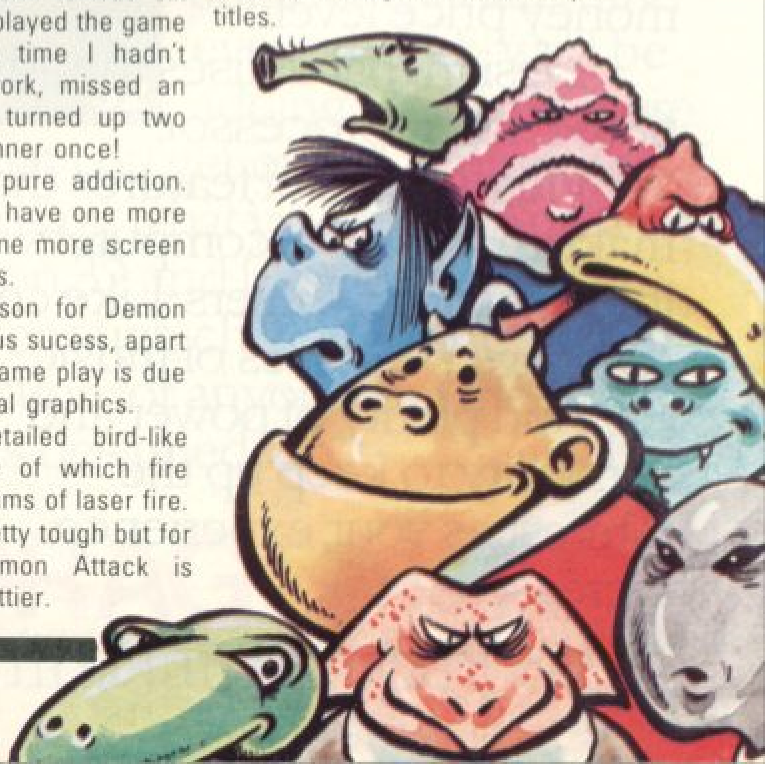
Best described as a cross between the two machines, Creatavision will go on sale in April with a range of twenty video games cartridges.

But the machine can do more than just play games as it incorporates a 16K fully programmable computer with a keyboard. The package comes complete with its own Basic cartridge and retails at £99.00.

The computer is fully expandible and all the usual peripherals will be produced later in the year. A compatible cassette recorder, disc drive, printer interface, and expansion cartridges up to 64K are all on the way.

Creatavision are hoping to enlist some of the independent software houses in the UK to write games for their machine. As this will take some time to organise there is likely to be a shortage of the cheaper cassette based software for this machine, than for the cheaper machines, like the Spectrum and Oric.

Cartridges for the Creatavision will range in price from £19 to £25 and include educational and business orientated subjects as well as a range of arcade-style titles.



## PRETTY TOUGH OR JUST PRETTY?

### DEMON ATTACK Vs PHOENIX

Demon Attack and Phoenix give a new meaning to the phrase "pretty tough". Both are shoot 'em up space games — and both are competing for sales in the lucrative Atari VCS market.

The similarities in game format and design have led to a legal battle in the US between Imagic, the manufacturers of Demon Attack, and Atari, the owners of the Phoenix copyright.

Demon Attack has been on sale for nearly twelve months now and was voted top video game of the year at the January Consumer Electronics Fair in Las Vegas — having out sold every other video game in the U.S. last year.

*Computer and Video Games'* resident VCS expert plugged in both games to see which one gave the toughest fight. First up on the screen was the brand new Atari cartridge Phoenix.

The first two screens were wiped out in seconds as they attacked at an insultingly slow pace — like drunken space invaders out of formation.

After the formality of dismissing these first two screens I was pleased to discover a tougher breed of alien on the third screen. These bird-like creatures were quick and elusive, showering me with heavy missile fire.

Tough as these aliens are they are not as tough as their counterparts in Demon Attack and the only real test for the seasoned video gamester comes on the fifth screen when you get to the Phoenix home base.

Now this is impressive and a reasonable simulation of the arcade game's exciting climax. Using skilful movement of the joystick you have to dodge in and lob a missile into the Phoenix fortress whilst dodging their heavy fire.

It may take several hits to erode the aliens' defences before you can get a clear shot at the centre of the Phoenix.

All the time the great bird-like hulk is edging down the screen towards your laser base.

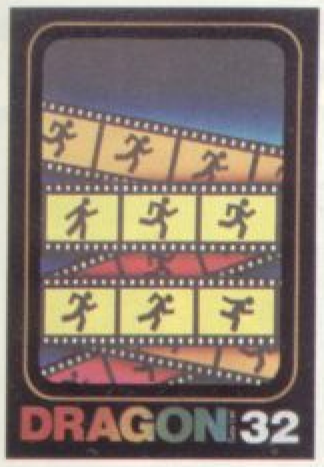
Demon Attack was plugged in with a measure of excitement and slight concern. It was six weeks since I'd played the game and during that time I hadn't been late for work, missed an appointment, or turned up two hours late for dinner once!

The game is pure addiction. You just have to have one more go. Got to see one more screen of different aliens.

The main reason for Demon Attack's enormous sucess, apart from the tough game play is due to the exceptional graphics.

They are detailed bird-like creatures, some of which fire long snaking beams of laser fire.

Phoenix is pretty tough but for my money Demon Attack is tougher and prettier.




Graphic Animator. A cassette that makes use of the Dragon's ability to draw on the screen. It shows you how to create simple cartoons - then bring them to life.




Personal Finance. This cassette allows you to keep track of all the family's finances, from bills to bank statements.




Ghost Attack. On cartridge. You're in a maze, and you must find your way out. But you're not alone - you're pursued by ghosts!




Chess. A great partner to play against again and again - with one major drawback. It's very hard to beat. Test yourself against nine different levels. On cartridge.



Typing Tutor. Only a keyboard as sophisticated as the Dragon's could allow you a program like this. You use the Dragon's own keyboard to learn to type. On cassette.



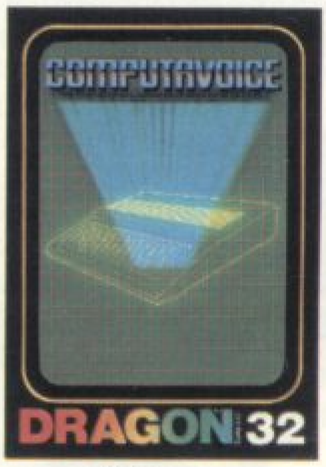

Cave Hunter. Finding the hidden gold is hard. But surviving the attacks of malevolent creatures may well prove to be impossible. Cave Hunter is on cartridge.




Dragon Selection. A cassette of utility programs, allowing you to create your own database. Write your own tunes - or learn other language vocabularies.




Starship Chameleon. A cartridge game. You find yourself under attack by the dreaded Gabolators! Their task is to take your planet - yours is to protect it.




Computavoice. This cassette actually enables your Dragon to speak to you.

These are just some of our titles, and every month, we'll be adding more and more.

What you get out of a computer depends on what you put in. And with a Dragon 32 and Dragon software, there's enough challenge and satisfaction for anyone. But then, that's what it's designed for.

**DRAGON 32**

The first family computer.

COMPETITION COMPETITION COMPETI

# CREATE YOUR OWN VISION FOR AUGHRA

The eccentric Aughra is Keeper of Secrets on the world of the Dark Crystal. She sees the strange life of her planet through a detachable eye and a permanent frown. We are offering her head to the winner of our Dark Crystal Competition!

Muppet producers, Henson Associates are flying a mask of Aughra's head over to the UK to give away as the prize for the best computer picture of a character from the film.

On top of the mask — one of three characters made by an American designer — the best graphical drawing will earn its creator a copy of the beautifully illustrated book about the making of the film plus an LP of the soundtrack.

The film's characters have already featured on a graphical adventure game which is available across a range of three micros — see our Games News pages.

The Dark Crystal features a horde of fascinating characters created by the pen of fantasy artist Brian Froud and then translated into the marvellous Muppet-like costumes and puppets by Jim Henson's team of Muppeteers.

As well as the one-eyed Aughra, there are the 10 evil Skeksis creatures who currently rule the world and the flawed crystal.

These are served by the poor exploited Pod People and a strange species of giant clawed battle fleas, the Garthim.







The gentle Mystics form the side of good and they send the Gelfling, Jen, in search of the missing shard of crystal. In his quest Jen is helped by a girl Gelfling, Kira, her friendly monster Fizzgig and a couple of steeds, the Landstriders — complete with walrus mustaches, floppy ears and giraffe legs.

You can choose any character or scene from the film on which to base your creation and draw it on any popular microcomputer. We will accept a tape with the program on it or a screen photograph — as long as it is clear. Please send your entries in by 20th May. If you want your tape or photograph returned, please include an S.A.E.

We have included a few pictures of some of our favourite characters from the film, to help you choose which to feature.

The judge's decision is final and no employees of EMAP or Henson Associates or their relatives may enter.



**On a recent raiding trip to Matlock in Derbyshire, top space pirate, Nicholas Tacticos has plundered a Colour Genie microcomputer.**

**Nicholas, who won our opening round of Seventh Empire hostilities, was invited up to Lowe Computers' Matlock head office to test out his prize.**

**He is pictured with the company's marketing manager, Richard Peat, as the two of them take the Colour Genie through its paces on a game of Skramble.**

**Back at his London W14 base, Nicholas, who commands the Spartans space tribe, hopes to put his Genie to good use, conjuring up some hot moves for the next reincarnation of the late lamented Seventh Empire.**

**You can read all about the disaster which brought about the fall of the Seventh Empire on page 95. The Computer and Video Games office is at this moment preparing for an attack by hundreds of unhappy space pirates!**

COMPETITION COMPETITION COMPETI

Few riddles have provoked the response our Riddle of the Sphinx competition enjoyed.

Hundreds of you reckoned to have solved the Imagic Atari cartridge's Egyptian challenge and sent in entries both to us and directly to Imagic distributors, Hales Ltd.

Such was the response that Hales managing director and chief judge, Clyde Roberts, has put up extra prizes for second and third places. Alan Mills of City Road, Sheffield, is the outright winner and wins a video games storage centre plus six Imagic cartridges.

Runner-up was Paul Williams of Sprowston, Norwich who wins a Video Command joystick and two cartridges from Imagic's range.

Third place went to Stephen Gordon of Yewtree Road, Beckenham, who can choose any two Imagic cartridges.

Imagic's own Riddle of the Sphinx author has produced a rundown of the solution which we re-print below, upside down, in case you haven't yet discovered it for yourself.

Imagic's team of Egyptologists has deciphered the papyrus scrolls recently discovered in the valley of the kings.

The next voice you hear will be that of a common scribe to the Royal Court of Egypt, relayed over 22 centuries.

"I son of Thoth witless scribe to Pharaoh's court, may tell now what before has not been known. These secrets of the Valley of the Kings have been revealed to me in a most curious fashion.

The royal astrologer, greatest magician in the land, slipped into a deep trance. He shook his head violently, he waved his arms, the sky grew dark. Water in his goblet boiled. Cats howled.

Still in a trance, the royal astrologer grew quiet. He opened his eyes — they glittered. In a strange voice, he began to speak.

"Young Prince of Wiles hear me, the answers to my clever clues I must give you, risking disfavour with the Gods. Still you must know.

Offer a key at each of the three pyramids. You will receive a magical tablet, offer the scroll to the flaming Phoenix. The Phoenix will bestow a key upon you. Should your way still be blocked, offer next the Tannis leaf.

At the temple of Isis, receive a key when you offer a crown. If Isis detains you offer next the jug.

Even Anubis gives a gift. Gingerly offer the Ankh at his temple and he will grudgingly give you a key. He may yet block your path, offer the shield and pass.

The inscrutable Sphinx will accept one of the three magical tablets you can have received at each of the three pyramids. You must offer the correct tablet if not, the sphinx may not allow you to proceed.

Son of Pharaoh, will you have found that companion you rely and lean upon, yet never think to call friend?"

The royal astrologer sighed as deep as all the ages. He continued: "Supple warrior Egypt's hope, remember the staff. Only the staff earns Ra's delight. Offer the staff and Ra will accept your treasures as ample tribute. But where does the staff of Ra lie hidden, you wonder? Youth has much to learn. Not all journeys follow the shortest course. When your trek begins, move not forward but backward, away from your destination. An oasis will appear drink deeply there. When you touch the oasis the staff of Ra will be yours. Guard it well guard it well. Guard it . . ."

The royal astrologer's chin dropped to his chest. He slept deeply he snored and fell off his stool. I have left him there, and scribbled these words like a man possessed. Will they ever be found? Will the secrets of the Valley of the Kings remain eternally chaste? Such knowledge yields great power. I must practice caution. Wait someone approaches. . .'

The Heiroglyphics go no farther. Then end abruptly, followed only by a small Cypher. Penned by another hand, it is the sign of Anubis: Guard these secrets well.

# CALLING ALL VIDEO CHAMPS

If you're an arcade ace with a high score or two to your name, then the 1983 Video Games Championships is the place to display your talents.

Taitel Electronics, the firm which introduced Space Invaders to the UK, is helping us to organise these championships with a top personality who also enjoys a trip to the arcades.

Simply take the form below down to your local arcade put the highest scores you can on your three favourite machines. Ask the arcade manager to witness the score and return it to us before June 13th at: Best Arcade Player, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB.

If you achieve a top score while this form is still at home, ask the arcade owner if he has any 1983 Video Games Championships forms. We are despatching forms to all the top arcades for use by their best players.

An arcade machine of your very own is the prize if you become our champion at a grand final which will be held this summer and all the finalists will get an expenses paid trip down to London to take part.

# Please enter the following scores in your 1983 Video Games Championships

My high score is: . . . . . . . . . . . .

It was scored on a:

. . . . . . . . . . . . machine

Date: . . . . . . . . . . . .

The manager of the pub/arcade who witnessed my score is:

. . . . . . . . . . . .

His signature: . . . . . . . . . . . .

Name & address of pub/arcade:

. . . . . . . . . . . .

. . . . . . . . . . . .

My high score is: . . . . . . . . . . . .

It was scored on a:

. . . . . . . . . . . . machine

Date: . . . . . . . . . . . .

The manager of the pub/arcade who witnessed my score is:

. . . . . . . . . . . .

His signature: . . . . . . . . . . . .

Name & address of pub/arcade:

. . . . . . . . . . . .

. . . . . . . . . . . .

My high score is: . . . . . . . . . . . .

It was scored on a:

. . . . . . . . . . . . machine

Date: . . . . . . . . . . . .

The manager of the pub/arcade who witnessed my score is:

. . . . . . . . . . . .

His signature: . . . . . . . . . . . .

Name & address of pub/arcade:

. . . . . . . . . . . .

. . . . . . . . . . . .

My name is: . . . . . . . . . . . .

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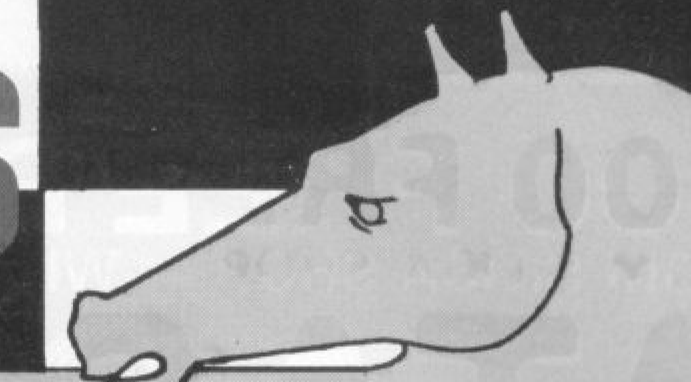
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# CHESS



This year the fourth World Computer Chess Championship will be held in New York from October 2-25, 1983, at the annual meeting of the Association for Computing Machinery (ACM).

The championship is being organised by the International Computer Chess Association (ICCA) which was formed at the second World Championship in Toronto in 1977 and has since grown considerably in stature and influence.

ACM has allocated $20,000 to cover the major tournament expenses and ICCA is now canvassing for further funds to enable it to bring noted chess players and computer scientists together at the tournament.

It is an indication of the growing respectability of computer chess that there will also be a special session devoted to the subject at the annual ACM conference which will be at the same site as the tournament.

## *BELLE OF THE BOARDS*

If the fourth championship follows the same pattern as the first three, which is likely, it will be a four-round Swiss-style tournament amongst approximately 16 programs.

Four rounds is barely adequate for a tournament of that size, but any increase would impose serious problems for competitors whose programs reside on mainframe computers, possibly on the other side of the world, accessed from a terminal over the telephone network.

Arranging hours of dial-up access, free of computer faults (or routine shutdowns) and hours of international phone calls without interference or accidental disconnection is hardly the easiest of tasks.

For this reason, amongst others, it is likely that microcomputers will take part in the tournament in greater numbers than before.

Although strictly a special purpose chess machine rather than a microcomputer, one contestant that will not have to rely on telephone lines and mainframe computer operators will be Ken Thompson's BELLE which has been described several times in previous articles.

BELLE finished equal first with CHAOS (also of the USA) at the Third World Championship at Linz, Austria, three years ago. Each program finished with 3½ points out of 4 and a play off game resulted in a powerful win for BELLE.

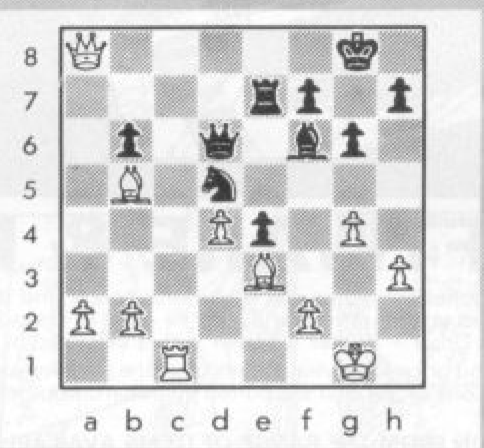
It is difficult to imagine BELLE failing to retain the championship in New York, but a short tournament naturally puts far more pressure on the best competitors than a long one. Even one mistake or machine breakdown can result in an irredeemable loss.

Barring breakdown or human operator error, the outcome of a computer tournament is completely predetermined before the first move is made, but this is not likely to deter a sizeable audience from attending the playing sessions.

World Championship Tournaments are held every three years at present — beginning at Stockholm in 1974 where the first championship was won by the Russian program Kaissa.

At that time Kaissa seemed unbeatable, but it lost heavily in the first round of the Second World Championship at Toronto in 1977.

This was the decisive position




Dutchess (White) has just played 34. Q/R8ch. Kaissa (Black) surprised the entire audience, which included Mikhail Botvinnik, Edward Lasker, Hans Berliner and Canadian International master Leon Piasetski by playing 34. .. R-K1, which places a Rook *en prise*.

Dutchess replied 35. QXRch and won a few moves later.

The immediate problem for Kaissa's programmers was to discover what subtle programming error could have led to this disastrous blunder. I will reveal the answer next month.

With Kaissa unexpectedly beaten in the first round, the American program Chess 4.6 took the lead and went on to win the Toronto Championship with 4/4.

This turned out to be the high point of the career of the "Chess" series of programs written by David Slate and Larry Atkin.

The successor of Chess 4.6, Chess 4.9, only scored 2½/4 at Linz in 1980, a full point behind BELLE.

Here is the first round game from Toronto in which Chess 4.6 beat BCP, a British competitor which is also likely to be competing at the fourth World Computer Chess Championship in New York this autumn.

Chess 4.6 (White) v BCP (Black)

1. P-K4, P-K4;
2. N-KB3, N-QB3;
3. P-Q4, PxP;
4. P-B3

The Goring Gambit which Chess 4.6 played regularly as White and which presumably occupied a large proportion of its 5,6000 position opening "book".

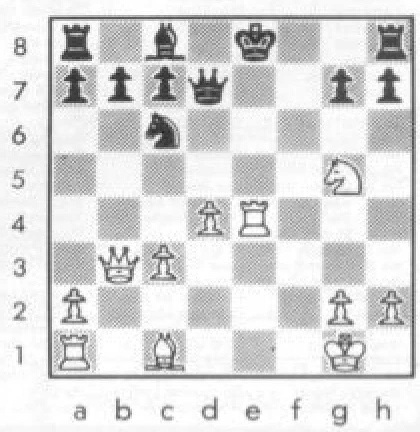
However, very few of its opponents ever seemed to take the trouble to prepare for the gambit.

In this case, because of technical problems BCP was playing without its usual 1,000 position "book", but finds an unusual continuation which took Chess 4.6 out of its "book" and into a probably inferior reply.

4. .., Q-K2;
5. PxP, QXPch;
6. B-KZ, P-Q4;
7. N-QB3, B-QN5;
8. O-O, BxN;
9. B-Q$!

Now BCP plays very weakly.

9. .. Q/K2;
10. PxB, N-B3;
11. Q/N3, N-K5;
12. R-K1, Q/K3;
13. N-KN5! Q/Q2;
14. P-KB3, P-KB4
15. PxN, BPxP;
16. BxP! PxB;
17. RxP ch




17. .., N-K2;
18. Q/B7ch, K/Q1;
19. QXP, Q/K1;
20. N-B7ch, K/Q2;
21. NxR, K/Q3
22. RxN, QXR
23. B-R3ch, K/B3;
24. QXQ, P-KR4
25. Q-B5ch, K/QZ;
26. R-K1, P-R3;
27. Q-Q5 mate.

**BY MAX BRAMER**

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ZIP!
INVADER
THUNK!
SPROING!
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A MICRO WITHOUT BUGS. TSSSCH! NO WONDER THE COUNTRY'S GOING TO THE DOGS.
R.A.M
BUT YOU'RE A BUG!!
YES
WHAT'S GOING ON? YOU'RE LETTING THE PROGRAMMER ENJOY HIMSELF!
YOU'RE BEHIND THE TIMES. THESE DAYS BUGS ARE USER FRIENDLY!
RAM
FAINT!
USER FRE.. ..UNGHH!!
THIS MEANS WAR!

# ARCADE




You've all been reading about those top scoring video-gamesters in these pages for some months now. How about letting us know about some of your pinball top scores?

It appears that more video-fans are sampling the delights of pinball. I recently heard about one such video freak who found his favourite screen machine occupied by another addict and was looking around for something to play to pass the time until he could get in on the video act when he spotted a pinball lurking in the corner of the arcade.

He wandered over, slipped a coin and began playing — and now, like many other people before him, he's totally hooked!

If you have been won over by a pin just let us know your high score, what machine you clocked it up on, your address and what arcade or pub your pin can be found in and we'll attempt to draw up a list of our top ten players.

## STAY COOL AND BEAT THE STING

### PENGO TIPS

Sno-bees are wary little creatures, not unduly malicious they seem to kill Pengo almost by accident. However the little devils know an ambush when they spot one.

In Pengo the player is a lone penguin up against a swarm of the creatures which try to run him to ground in a maze of blue ice blocks.

The bees possess a deadly sting which send Pengo sprawling onto his back and looking decidedly dizzy.

Pengo has two methods of fighting back. He can squash the bees behind a speeding ice block or "peck" the surrounding wall of the screen, stunning any Sno-bee who happens to be in contact with it.

Like all maze games, Pengo is a battle for survival and a lesson in the art of ambush, and Sno-bees know all the tricks!

The scoring though depends on more than just surviving.

There are three ways to make the most of each Pengo screen in terms of points and a good player will decide early on which method best suits each particular maze.



The way most beginners start to score is by squashing individual bees and eventually clearing the screen.

Squashed Snobees are worth 480 points each when tackled individually.

But come the end of the screen, when the last bee dithers and then dashes headlong into a corner to disappear, the bonus score based on time taken to clear the screen is often miserly.

To clear the screen quickly can boost a score. One way is to note each of the flashing ice blocks which will later turn into Sno-bees and peck them to disintegration before that change can happen.

Don't spend time planning an ambush for a wandering bee — they usually avoid them, especially at close quarters — but take your chances when they come. Learn to recognise patterns of bee movement: when one starts melting a chain of blocks, it is a safe bet to wait behind the last one and squash him.

The second way to achieve a big score is to squash multiple bees with one block. Like eating Pacman ghosts, taking two bees with one shot earns bigger scores, of 1,600.

It is a legitimate tactic to aim for as the bees have a habit of following one another up a corridor of the game.

Making bees dizzy along the side of the screen can also leave them open to this tactic.

The third way to collect points is to push the three permanent ice blocks together. This tactic must be practised to appreciate the right way of approaching the uniting of the blocks.

It is often most practical to achieve this along an edge of the screen. Just getting two of the blocks together adds a bonus but the big score is achieved by linking all three.

Don't leave this tactic until the last Sno-bee is about to dive off-screen as it will probably be too late, but look for opportunities to work the permanent blocks into good positions during the course of the screen battle.

Remember that the bees can't destroy those blocks either and they can therefore make useful hiding places for Pengo when he needs a break!

## WHAT'S BUGGING YOU NOW — MORE INSECTS!

### MILLIPEDE

The bugs are back with a vengeance! Just when you were conquering the nasties of Centipede, the horrors of Millipede have arrived.

Like its predecessor, the Millipede starts at the top of the screen, snaking its way through the giant mushroom forest and splitting whenever it is hit by an arrow.

A released tail segment will turn into a new head, a Millipede reaching the bottom will produce new heads, entering from the side of the screen.

The spider still features, jumping up and down in a random pattern across the screen, but there's a host of new creatures too. The bee bombards the player much as the flea used to but a first hit only serves to make them dash around the screen that much faster!

The dragonflies do a similar job, depositing mushrooms on their zig-zag downwards path. Mosquitos fly diagonally across the screen. If hit by the player, the playfield scrolls up one row.

Earwigs glide across the upper portion of the playfield poisoning any mushrooms they touch, as the scorpion used to. Beetles turn any mushroom they touch into an indestructable flower. A hit on the beetles will scroll the screen down one row.

The inchworms crawl slowly across the screen and each hit on one will slow the action down for $3\frac{1}{2}$ seconds allowing the player some much-needed breathing space.

At certain play levels a destroyed Millipede will result in a bombing run of bees, dragonflies and mosquitos.

The player does have one other weapon to help with this invasion.

Four DDT bombs are placed on each screen and can be blown up by an arrow releasing their deadly gas to destroy anything in the vicinity.



Illustrations: Terry Rogers

# ACTION



## FLIGHTS OF FANTASY

### TIME PILOT

A flight through the five ages of man's domination of the air takes place in Time Plot.

The player steps into the cockpit of a modern-day jet and instantly finds himself transported back in time to the era of the bi-plane, circa 1910.

The bi-planes, tackled singly, are no match for the jet but there are a lot of them and they keep up a persistant hail of bullets. Their mothership takes the shape of a large balloon and it must be hit seven times to allow the player to timewarp into the next age.

He rematerialises in the Second World War, 1940, where monoplanes fill the skies.

Still, he holds an advantage but must use it wisely to counter the threat of the fighters and bombers.

Off into the seventies as jet-range helicopters armed with deadly homing missiles take on the player's jet. The helicopters are far more manoeuvrable, appearing out of the clouds, all around the player's jet. A large copter with two sets of blades, takes on the roll of mothership.

The fourth age of flight, takes the jet into the present with modern-day planes like itself.

The fifth age is the future with UFOs and flying saucers providing the ultimate challenge. Their technology far outstrips that of the player's jet and they are armed with powerful weapons.

More points can be accrued by catching and rescuing parachuting pilots.

## PACKING A PUNCH!

### POPEYE

The cartoon character who made a Spinach Marketing Board redundant long before such things were fashionable, has now punched his way into the arcades.

Popeye and the entire team of unlikely characters which made up his cartoon series are battling arch villain Brutus.

Very much in the "cute" mould with three screens all featuring levels and ladders, the player controls Popeye catching hearts, musical notes and lettering as they drift down the screen after being carelessly scattered by Olive Oyl.

Our seafaring hero starts at the top of the harbour scene running up and down ladders in an effort to dodge Brutus but still be sure of not letting a single heart fall.

Brutus will lunge and punch through the levels as well as being a threat on the same level. He and a Sea Hag character also pose another threat by hurling bottles at Popeye.

Popeye can punch his way out of this kind of danger but the timing of that punch is critical.

Once Popeye's house is covered in captured hearts he can move onto the next challenge. The action takes place in a warehouse this time with Popeye catching falling musical notes from Olive's flute. Sweet Pea is at the top of the screen filling in a score for each note caught.

Wimpy munches hamburgers and waits for Popeye to jump on his see-saw. A completed musical score sees the action move to a third challenge on board ship. Ms Oyl is trapped at the top of the mast and calls "HELP", the letters drifting critically seawards. Joining in the fray here is a vulture who swoops down on Popeye.

And the spinach? That turns up in cans which turn Popeye pink with vitality and allow him to hit back at Brutus for as long as his theme tune sounds.



## SPLIT SCREEN HERO

Battle was joined on the Robotron scene with a rush of scores finishing with Spencer May narrowly pipping the rest with a phenomenal 3,576,800 score.

Danish reader Michael Panayotis starts us off on Space Dungeon and Greg Parsons gives us a top Zaxxon score.

Greg also tells us about a local arcade hero in Worthing who has "split the screen" on Pacman.

This is achieved by going beyond the 240th "key" screen which causes the screen to split and the right-hand-side to be covered in coding.

This has been achieved several times in the States but I have not heard of anyone else managing it in Britain.

If Mun-Chi Yip would like to get in touch he should find a secure place in our Record Breakers charts.

All you record breakers should be rushing to your local arcades with the form to be found on page 11 of this magazine where you'll find details of our search for a new champion.

Final note: Martin Stone has also beaten my own transitory record on Pengo . . . but I'll be back!?

GORF
1,511,650
Greg Parsons

PENGO
374,950
Martin Stone

ROBOTRON
3,576,800
Spencer May

FROGGER
137,200
B. Nesbit

MOUSETRAP
621,700
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154,865
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143,731
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DONKEY KONG
604,700
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2,224,200
Nick Starkings

ZAXXON
713,950
Greg Parsons

TEMPEST
1,080,260
Paul Mitchell

AMIDAR
782,010
Adrian Eyre

It's a big day for the new Formula One world champion. His team are testing the new car which they plan to use to defend their championship title in the new season — just a few short weeks away. Today is the day when the champ gets behind the wheel of the new car for the first time. Will he be able to match his world-beating performance and defeat the fastest times of his four-wheeled opponents?

Your aim is to see how long he can survive on a rigorous test circuit. Sounds easy, but there is oil on the track and the cars handling is not good. The object of the game is to survive as many laps as possible in as short a time as possible.

The car slows down in the oil patch and sometimes skids. So watch out! It's not all bad, you can choose the colour of your car and your testing race circuit.

The program has been written for an Atom with floating point ROM and no colour encoder board. For those Atom owners with a colour encoder board, read "WHITE" as "YELLOW", "BLACK" as "BLUE" etc. For those Atom owners with no "F.P." extension, conversion should be easy: remove all "COLOUR" statements, replace "CLEAR 3" with "CLEAR 2", and re-

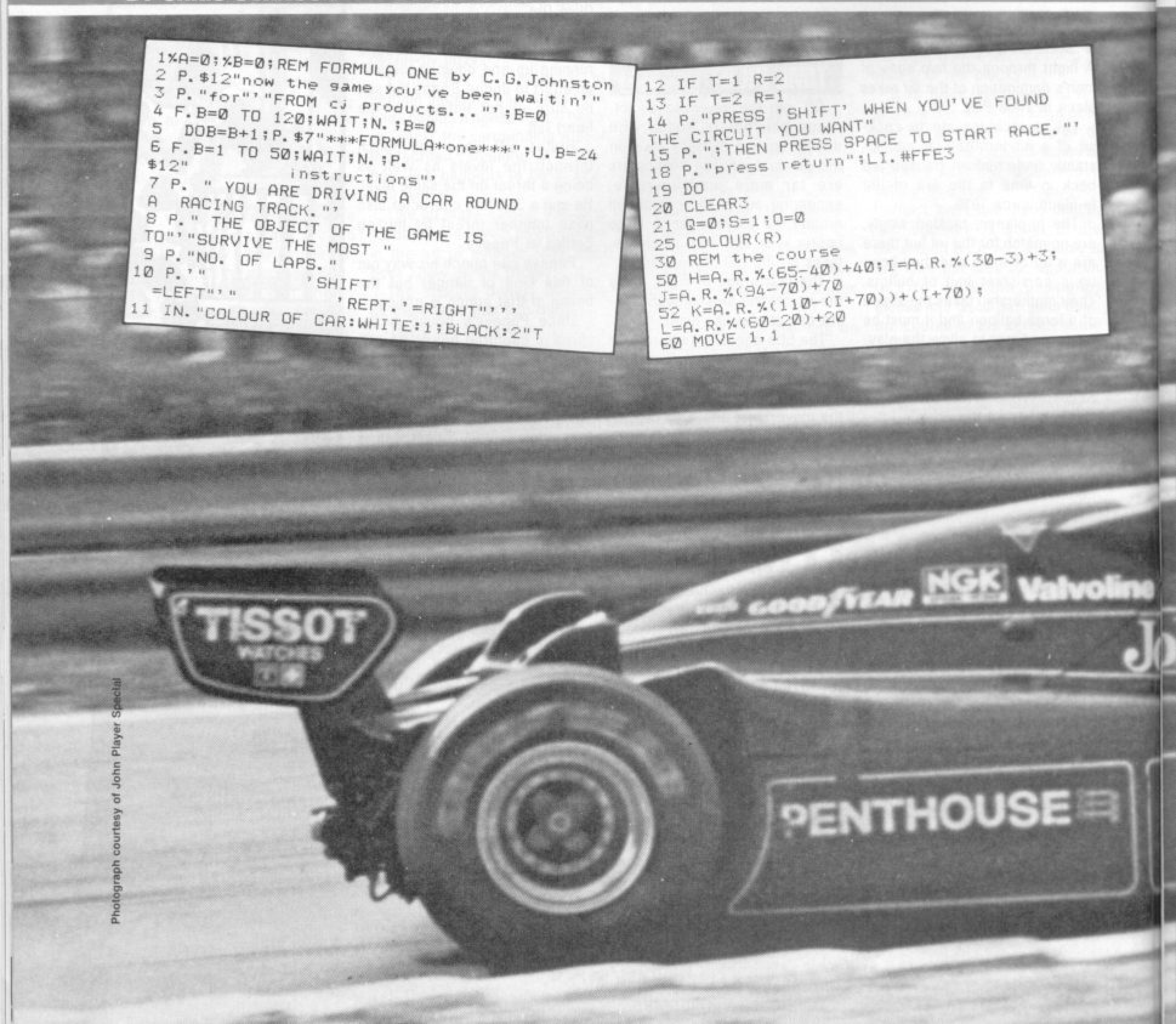
**RUNS ON AN ATOM IN 12K WITH F.P. ROM**

**RUNS ON AN ATOM IN 12K WITH F.P. ROM**

# FORMULA ONE · FORMULA ONE·

**BY CHRIS JOHNSON**

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```
1%A=0;%B=0;REM FORMULA ONE by C.G.Johnston
2 P.$12"now the game you've been waitin'"
3 P."for"'"FROM cj products..."';B=0
4 F.B=0 TO 120;WAIT;N.;B=0
5  DOB=B+1;P.$7"***FORMULA*one***";U.B=24
6 F.B=1 TO 50;WAIT;N.;P.
$12"              instructions"'
7 P. " YOU ARE DRIVING A CAR ROUND
A  RACING TRACK."'
8 P." THE OBJECT OF THE GAME IS
TO"'"SURVIVE THE MOST "
9 P."NO. OF LAPS."
10 P.'"              'SHIFT'
 =LEFT"'"              'REPT.'=RIGHT"''
11 IN."COLOUR OF CAR:WHITE:1;BLACK:2"T
```

```
12 IF T=1 R=2
13 IF T=2 R=1
14 P."PRESS 'SHIFT' WHEN YOU'VE FOUND
THE CIRCUIT YOU WANT"
15 P.";THEN PRESS SPACE TO START RACE."'
18 P."press return";LI.#FFE3
19 DO
20 CLEAR3
21 Q=0;S=1;O=0
25 COLOUR(R)
30 REM the course
50 H=A.R.%(65-40)+40;I=A.R.%(30-3)+3;
J=A.R.%(94-70)+70
52 K=A.R.%(110-(I+70))+(I+70);
L=A.R.%(60-20)+20
60 MOVE 1,1
```

Photograph courtesy of John Player Special

place "%A" and "%B" with an array.

The car does not flip round immediately, but moves diagonally and then flips. Release the key once you have "flipped" to prevent the steering from locking.

Go wide coming up to corners and cut the corners as fine as possible. Watch the car does not flip too soon (in the oil patch for example).

For a fast time keep the car following the best racing line to snatch the quickest time around the track for the maximum possible time. Remember it is the maximum number of laps and then the quickest time in that lap zone which counts.

"SHIFT" moves the car left and "REPT" moves it right.

**VARIABLES:**

%A: most number of laps
%B: quickest time in zone
A: If A = 1 blank car
B, C: key press counters
D: counter
E, F, G, N: values in keypress
H, I, J, K, L: RND course values
O: time
Q: number of laps
R: colour of circuit
S: lap counter
T: colour of car
*U, V, W, Z* — "PLOT" function
*X, Y:* co-ordinates of car

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# E· FORMULA ONE· FORMULA ONE

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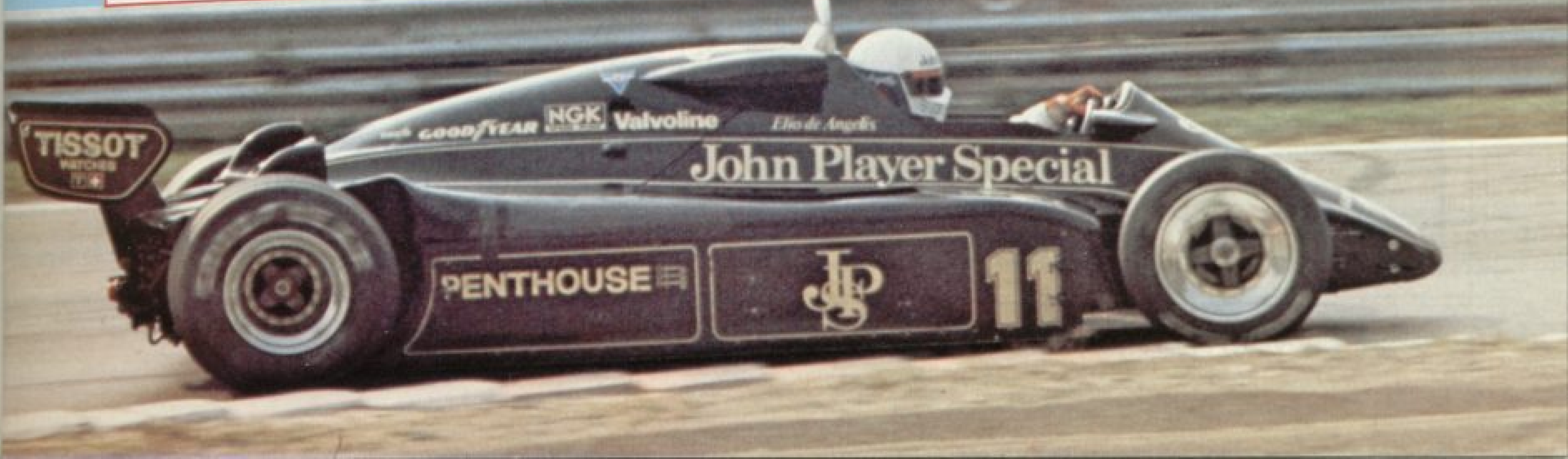
```
70 DRAW 1,H;DRAW I,H;DRAWI,J
72 DRAW K,J;DRAW K,(H+5);DRAW 125,(H+5)
73  DRAW 125,10;DRAW L,10;DRAWL,1;DRAW1,1
74 REM inside boundary
75 MOVE 16,23
77 DRAW 16,(H-17);DRAW(I+16),(H-17)
79 DRAW(I+16),(J-17);DRAW(K-17),(J-17)
81 DRAW(K-17),(H-7);DRAW 108,(H-7)
83 DRAW108,27;DRAW(L+27),27
85 DRAW(L+27),23
87 DRAW 16,23
89 REM start line
90 GOS.t
93 X=(K-50);Y=(J-8)
95 REM oil slick
```

```
96 GOS.a
101 COLOUR (T)
145 F.U=0 TO 30;WAIT;N.
150 U.?#B001&#80=0
200 LINK#FFE3
299 REM"left + right" movement
300 Z=13;U=12;V=5;W=15;A=1;B=1;C=1;
E=#B001;F=#B002;G=#40
301 N=#80
350aPLOTU,(X-2),(Y+2);PLOTV,(X-2),
(Y-2);PLOTU,(X-1),(Y+3)
360 PLOTV,(X-1),(Y-3);PLOTU,X,(Y+1);
PLOTV,X,(Y-1)
370 PLOTU,(X+1),(Y+2);PLOTV,(X+1),(Y-2);
PLOTU,(X+2),(Y+1)
```



```
380 PLOTV,(X+2),(Y-1);PLOTW,X,Y
394 GOS.z
395 IFA=1 A=2;Z=15;V=7;G.a
397 IFA=2 A=1;Z=13;V=5
500 IF?F&G=0;Y=Y-2;X=X+2;B=B+1;C=2
510 IF?E&N=0;Y=Y+2;X=X+2;C=C+1;B=2
515 IF?F&G<>0 AND ?E&N<>0;X=X+4;C=1;B=1
520 IF B=6 G.b
530 IF C=6 G.c
550 G.a
600 REM "top → bottom" movement
610bPLOTU,(X-2),(Y+3);PLOTV,(X+2),(Y+3);
PLOTU,(X-3),(Y+2)
620 PLOTV,(X+3),(Y+2);PLOTU,(X-1),(Y+1);
PLOTV,(X+1),(Y+1)
630 PLOTU,(X-1),Y;PLOTV,(X+1),Y;PLOTW,X,Y
640 PLOTU,(X-2),(Y-1);PLOTV,(X+2),(Y-1);
PLOTU,(X-1),(Y-2)
650 PLOTV,(X+1),(Y-2)
655 GOS.z
660 IFA=1 A=2;Z=15;V=7;G.b
670 IFA=2 A=1;Z=13;V=5
700 IF?F&G=0;Y=Y-2;X=X-2;B=B+1;C=2
710 IF?E&N=0;Y=Y-2;X=X+2;C=C+1;B=2
720 IF?F&G<>0 AND ?E&N<>0;Y=Y-4;C=1;B=1
730 IFB=6 G.d
740 IFC=6 G.a
750 G.b
800 REM "bottom → top" movement
810cPLOTU,(X-2),(Y-3);PLOTV,(X+2),(Y-3);
PLOTU,(X-3),(Y-2)
820 PLOTV,(X+3),(Y-2);PLOTU,(X-1),(Y-1);
PLOTV,(X+1),(Y-1)
830 PLOTU,(X-1),Y;PLOTV,(X+1),Y;PLOTW,X,Y
840 PLOTU,(X-2),(Y+1);PLOTV,(X+2),(Y+1);
PLOTU,(X-1),(Y+2)
850 PLOTV,(X+1),(Y+2)
855 GOS.z
860 IFA=1 A=2;Z=15;V=7;G.c
870 IFA=2 A=1;Z=13;V=5
880 IF?F&G=0;Y=Y+2;X=X+2;B=B+1;C=2
885 IF?E&N=0;Y=Y+2;X=X-2;C=C+1;B=2
890 IF?F&G<>0 AND ?E&N<>0;Y=Y+4;C=1;B=1
895 IFC=6 G.d
897 IFB=6 G.a
898 G.c
900 REM"right → left" movement
950dPLOTU,(X+2),(Y+2);PLOTV,(X+2),(Y-2);
PLOTU,(X+1),(Y+3)
960 PLOTV,(X+1),(Y-3);PLOTU,X,(Y+1);
PLOTV,X,(Y-1)
970 PLOTU,(X-1),(Y+2);PLOTV,(X-1),
(Y-2);PLOTU,(X-2),(Y+1)
980 PLOTV,(X-2),(Y-1);PLOTW,X,Y
994 GOS.z
995 IFA=1 A=2;Z=15;V=7;G.d
997 IFA=2 A=1;Z=13;V=5
1000 IF?F&G=0;Y=Y+2;X=X-2;B=B+1;C=2
1010 IF?E&N=0;Y=Y-2;X=X-2;C=C+1;B=2
1015 IF?F&G<>0 AND ?E&N<>0;X=X-4;C=1;B=1
1020 IFB=6 G.c
1030 IFC=6 G.b
1040 G.d
2000zREM crash ???
2010 IFX<5 G.y
2020 IF X>(L-2) AND Y<14G.y
2040 IFY>(J-4) G.y
2050 IF Y>(H+3) AND X>(K-3) G.y
2055 IFY>(H+3) AND X>(K+2) G.y
2060 IF X>121 G.y
2081 IF Y<5 G.y
2082 IF Y>(H-3) AND X<(I+4) G.y
2085 IF((X>(K-15))&(X<(K+3))&(Y<(H+6))&(Y>
(H-10)))G.r
2090 G.x
2095mF.D=1 TO 6;?F=?F&3100:4;N.;O=O+1
2096 IF((X>16)&(Y>(J-18))&(S=0))Q=Q+1;S=1
2097 IF((X<16)&(S=1)&(Y>23))S=0
2099 R.
2200xREM "inside" check
2201 IF((X>(I+13))&(X<(K-13))&(Y<(J-12))&
(Y>25))G.y
2204 IFX>110 G.m
2205 IF((X<112)&(X>(K-19))&(Y<(H-3))&
(Y>23))G.y
2210 IF Y>(J-14) G.m
2220 IF X<14 G.m
2230 IF X>(K-17) AND Y>(H-5) G.m
2240 IF X>105 G.m
2250 IF X>(L+30) AND Y<25 G.m
2260 IF X>(I+16) AND Y>(H-17)  G.m
2270 IF Y<20 G.m
2280 IF Y>(H-14) AND X<(I+14) G.m
2999 REM explosion
3000yCOLOUR(R)
3001 F.D=1 TO 15;?F=?F&RND:4;N.
3030 MOVE X,Y
3040 DRAW (X-3),(Y-3);MOVEX,Y;DRAW (X+3),
(Y-3);MOVE X,Y
3050 DRAW(X+3),(Y+3);MOVEX,Y;
DRAW(X-3),(Y+3)
3060 MOVEX,Y;DRAW(X+4),(Y+5)
3065 F.D=1 TO 20;?F=?F&RND:4;N.
3070 MOVE X,Y;DRAW (X-6),(Y+5)
3080 MOVEX,Y;DRAW(X+6),(Y-3)
3090 F.D=1 TO 90;?F=?F&RND:4;N.
3999 REM time,most laps
4000 P.$12;@=0
4010 P."TIME = "O'
4020 P."NUMBER OF LAPS = "Q'
4028 FIFQ=%A;FIF%B>O;%B=O;G.4040
4029 FIFQ=%A G.4040
4030 FIFQ<%A G.4040
4031 %A=Q
4032 %B=O
4040 P."MOST NUMBER OF LAPS = "%A" IN "%B'
4050 P."PRESS RETURN TO START AGAIN";
L.I.#FFE3;G.19
5000qREM oil slick
5005 GOS.t;REM re-draw start line
5010 COLOUR 2
5020 F.P=(H+8)TO(H-7) S.-1
5030 MOVEK,P;DRAW(K-17),P
5040 N.P;COLOUR(T);R.
5999 REM skid
6000rGOS.q;IFX>(K-4) G.2090
6005 IFR.%8=0 GOS.s
6010 G.2090
6050sF.D=0 TO 180;?F=?F&R.:4;N.
6060 X=X+(A.R.%10);Y=Y+(R.%4);R.
7000tREM start line
7010 COLOUR(T);MOVE(K-50),J;F.M=(J-17)
TO (J) S.2
7020 PLOT13,(K-50),M;N.M;R.
```

Photograph courtesy of John Player Special



# For the best hardware, the best software.

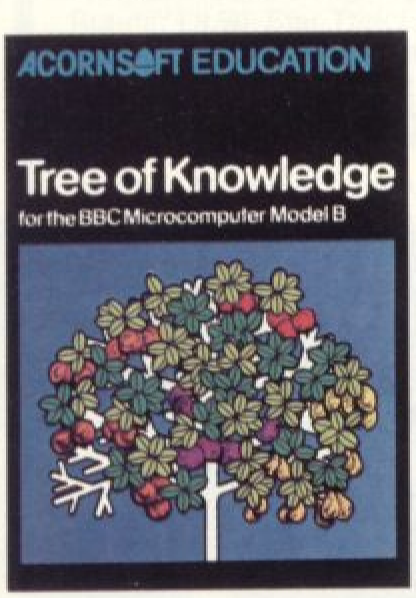
The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So, if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

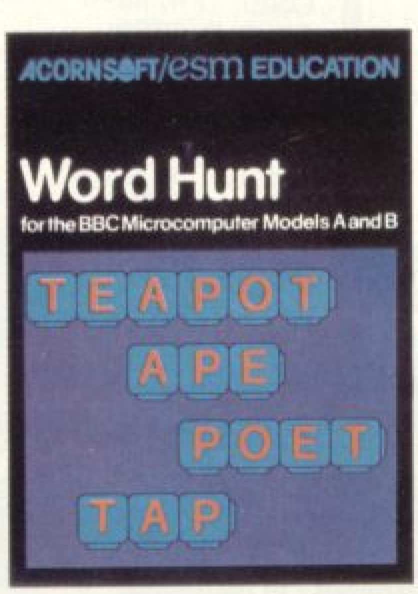
Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

<u>Further education for everyone.</u>

Tree of Knowledge (£9.95) is an interactive program for children of all ages teaching categorisation. It illustrates some of the more practical aspects of computing in that the pupil first educates the computer, building up a database by answering the computer's questions, and the database is then used to play games of deduction and logic.

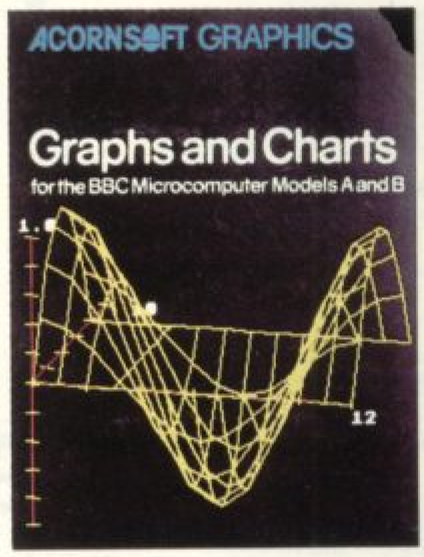
Word Hunt (£11.90) is a set of four programs, each containing a list of nine words. The object of the exercise is to select one word and then try to create as many smaller words as possible from the selected word.

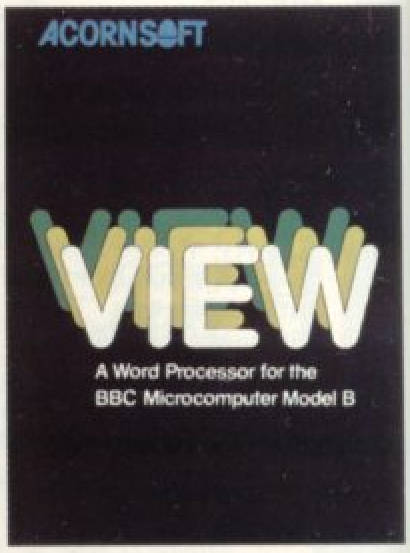



<u>Increase your business acumen.</u>

Graphs and Charts (price £17.45) which includes the book 'Graphs and Charts on the BBC Microcomputer' contains a set of programs to present data graphically in a wide range of applications. The graphs include automatic scaling, labelling of axes and use of colours.



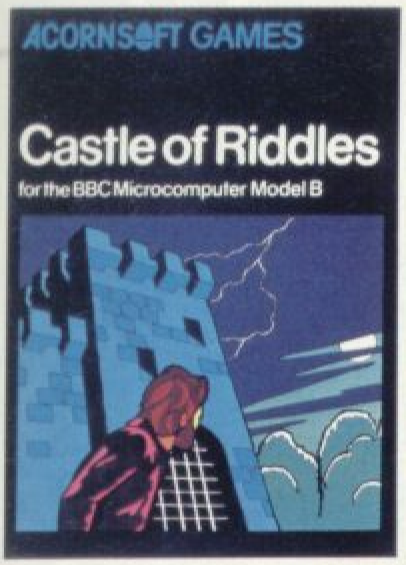



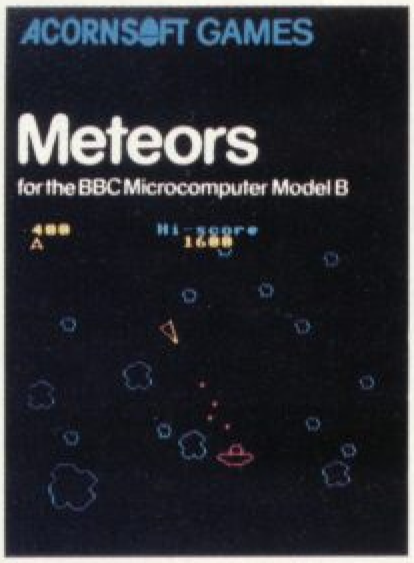

And VIEW (price £59.80) a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer). You'll find out more by going to your dealer or by sending for the free catalogue.

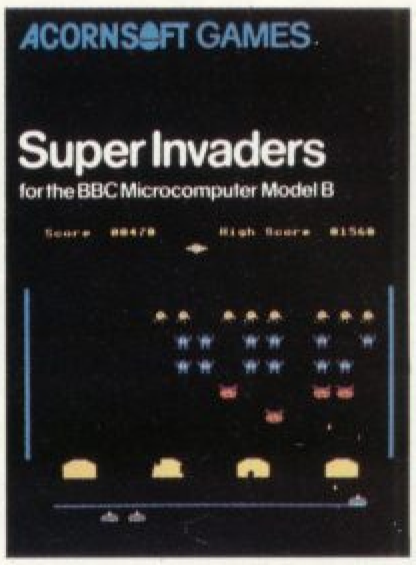
<u>Mind-boggling games.</u>

Castle of Riddles (price £9.95) is a magical adventure, with wizardry and hocus pocus of all kinds; booby traps and fiendish riddles to be unravelled along the tortuous route to the Magic Ring of Power. Your reward is to keep the






treasure you find along the way.

Meteors (price £9.95) is a game where you have to manoeuvre your laser-ship through a hail of meteors, smashing them with your laser bolts as they hurtle towards you on all sides. Complete with sound effects and table of Hi-Scores.

Super Invaders (price £9.95) is a fight against invading aliens. The only way to resist and avoid subsequent annihilation is to destroy the aliens before they land. You have three mobile launchers whose hyper-velocity missiles will instantly vaporise their target on impact. This game includes high-score, and is fully compatible with either keyboard or joysticks.

## Understanding computers.

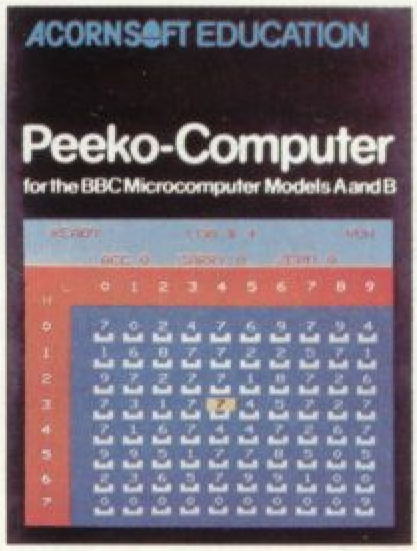
Peeko-Computer (price £9.95) simulates the operation of a simplified microcomputer in order to teach the fundamentals of machine-code programming. It comes complete with a 16 page instruction manual including exercises and examples, and the cassette features five demonstration Peeko-Computer programs.



## How to get Acornsoft programs.

If you're a credit card holder and would like to buy cassettes of the programs shown in this advertisement, or if you would like to know the address of your nearest stockist, just phone 01-200 0200.

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| Meteors | £9.95 | | | SBG13 |
| Super Invaders | £9.95 | | | SBG16 |
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| | | TOTAL | | |

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**Downhill slalom racing is one of the most demanding of all winter sports. Now you can experience the thrills and spills of the real thing — but without suffering the bruises and broken bones!**

**Your Texas will set up a testing slalom ski-run — complete with all the gates and a few hazards to watch out for. Use the cursor keys to control your skier. You get three lives to play with. And once you reach the finish you are promised a colourful reception!**

**Program notes**
100-150: Initialisation.
160-600: Define characters and course.
610-790: Move skier and check keyboard.
800-930: Redefine skier.
940-1410: Instruction routine.
1420-1470: Data positions for flags and trees.
1480-1740: Winner routine.
1750-2010: Hit tree routine.
2020-2270: Hit flag routine.
2280-2420: Ran out of lives routine.



**RUNS ON A TEXAS TI99/4a IN 16K**

**BY DAVID KIMBERLIN-WYER**

```
100 CALL CLEAR
110 GOTO 940
120 CALL CLEAR
130 CALL SCREEN(5)
140 CALL COLOR(1,3,16)
150 P=3
160 RESTORE
170 CALL CHAR(104,"0C0C191E18080
9FE")
180 CALL CHAR(112,"1010383870 7CF
E10")
190 CALL CHAR(120,"0C3C7C3C0C040
404")
200 CALL CHAR(128,"383810FEBABA2
86C")
210 CALL CHAR(129,"38BA92FE38382
86C")
220 CALL CHAR(105,"3030987818109
0FF")
230 CALL COLOR(11,3,16)
240 CALL VCHAR(1,1,112,22)
250 CALL VCHAR(1,32,112,22)
260 CALL HCHAR(1,1,112,32)
270 CALL HCHAR(22,1,112,32)
280 FOR N=0 TO 41
290 READ A,B,C
300 FOR M=A TO B
310 CALL HCHAR(C+1,M+1,112)
320 NEXT M
330 NEXT N
340 CALL COLOR(12,9,16)
350 FOR N=0 TO 31
360 READ A,B
370 CALL HCHAR(A+1,B+1,120)
380 NEXT N
390 CALL COLOR(5,2,16)
400 CALL HCHAR(5,6,32)
410 CALL HCHAR(6,4,32)
420 FOR N=5 TO 7
430 CALL COLOR(N,2,16)
440 NEXT N
450 CALL HCHAR(2,2,83)
460 CALL HCHAR(3,2,84)
470 CALL HCHAR(4,2,65)
480 CALL HCHAR(5,2,82)
490 CALL HCHAR(6,2,84)
500 CALL HCHAR(16,31,70)
510 CALL HCHAR(17,31,73)
520 CALL HCHAR(18,31,78)
530 CALL HCHAR(19,31,73)
540 CALL HCHAR(20,31,83)
550 CALL HCHAR(21,31,72)
560 E=104
570 X=3
580 Y=3
590 A=0
600 B=0
610 CALL KEY(0,K,S)
620 IF K=83 THEN 800
630 IF K=68 THEN 840
640 IF K=88 THEN 880
650 IF K=69 THEN 910
660 X=X+A
670 Y=Y+B
680 CALL COLOR(10,2,16)
690 CALL COLOR(13,2,16)
700 CALL GCHAR(X,Y,C)
710 IF C=112 THEN 1760
720 IF C=120 THEN 1230
730 IF (C=70)+(C=72)+(C=78)+(C=8
3)+(C=72)THEN 1470
740 CALL HCHAR(X,Y,E)
750 CALL SOUND(200,-5,9)
760 CALL HCHAR(X,Y,32)
770 CALL HCHAR(22,9,128,21)
780 CALL HCHAR(22,9,129,21)
790 GOTO 610
800 B=-1
810 A=0
820 E=105
830 GOTO 630
840 B=1
850 A=0
860 E=104
870 GOTO 640
880 B=0
890 A=1
900 GOTO 650
910 B=0
920 A=-1
930 GOTO 660
940 CALL SCREEN(5)
950 FOR N=1 TO 9
960 CALL COLOR(N,5,16)
970 NEXT N
980 CALL CHAR(35,"3C4C99A1A19942
3C")
990 CALL CLEAR
1000 K$="99'ER SKIING BY"
1010 Z=2
1020 GOSUB 1350
1030 K$="# DAVID KIMBERLIN-WYER.
"
```

# SKI-ING



```
1040 Z=4
1050 GOSUB 1350
1060 K$="WELCOME TO SKIING.MAKE
YOUR"
1070 Z=6
1080 GOSUB 1350
1090 K$="WAY DOWN THE COURSE USI
NG THE"
1100 Z=8
1110 GOSUB 1350
1120 K$="CURSOR KEYS TO DOGE THE
 FLAGS"
1130 Z=10
1140 GOSUB 1350
1150 K$="AND FOREST TO REACE THE
 FINISH"
1160 Z=12
1170 GOSUB 1350
1180 K$="AND COLOURFUL CELEBRATI
ON."
1190 Z=14
1200 GOSUB 1350
1210 K$="BUT BE WARNED YOU ONLY"
1220 Z=17
1230 GOSUB 1350
1240 K$="HAVE 3 LIVES."
1250 Z=19
1260 GOSUB 1350
1270 FOR M=262 TO 312 STEP 8
1280 CALL SOUND(100,M,0)
1290 CALL SOUND(100,M-60,0)
1300 NEXT M
1310 M=1 TO 600
1320 NEXT M
1330 CALL CLEAR
1340 GOTO 120
1350 Y=16-INT(LEN(K$)/2)
1360 FOR I=1 TO LEN(K$)
1370 CD=ASC(SEG$(K$,I,1))
1380 CALL HCHAR(Z,Y+I,CD)
1390 NEXT I
1400 RETURN
1410 DATA 5,30,1,6,8,2,13,30,2,2
5,30,3,28,30,4,27,30,5,1,3,6,9,1
0,6,22,22,6,29,30,6,1,23,7
1420 DATA 30,30,7,1,7,8,12,2,3,8
,30,30,8,1,6,9,17,22,9,1,4,9,30,
30,9,1,1,10,30,30,10,1,1,11,29
1430 DATA 30,11,1,1,12,10,11,12,
29,30,12,1,1,13,9,14,13,2,30,13,
1,1,14,5,15,14,21,3,0,14,1,1
1440 DATA 14,1,1,15,5,30,15,1,1,
16,6,30,16,1,1,17,1,1,18,19,24,1
8,1,6,19,1,30,20
1450 DATA 3,8,3,5,5,5,5,8,2,11,4
,11,4,17,6,17,3,22,5,22,7,24,7,28
,9,28,9,25,12,23,10,23,11,19
1460 DATA 13,15,10,15,12,15,8,10
,10,10,10,7,12,7,10,2,13,4,16,4,
16,2,17,9,1,9,19,12,17,12
1470 FOR N=110 TO 210 STEP 8
1480 CALL SCREE(INT(RND*15)+1)
[illegible]
1840 K$="BAD LUCK YOU HIT A TREE"
1850 Z=24
1860 GOSUB 1350
1870 FOR M=110 TO 155 STEP 8
1880 CALL SOUND(100,M,0)
1890 NEXT M
1900 CALL HCHAR(24,1,32,32)
1910 K$="LOOSE ANOTHER LIFE
"
1920 Z=24
1930 GOSUB 1350
1940 FOR N=110 TO 210 STEP 8
1950 CALL SOUND(100,N,0)
1960 NEXT N
1970 CALL HCHAR(24,1,32,32)
1980 P=P-1
1990 IF P=0 THEN 2290
2000 E=104
2010 CALL HCHAR(X,Y,112)
2020 GOTO 570
2030 CALL HCHAR(X,Y,E)
2040 FOR N=250 TO 110 SEP-8
2050 CALL SOUND(100,N,0)
2060 NEXT N
2070 FOR N=5 TO 9
2080 CALL COLOR(N,2,16)
2090 NEXT N
2100 K$="HA HA YOU HIT A FLAG"
2110 Z=24
2120 GOSUB 1350
2130 FOR N=262 TO 110 STEP -8
2140 CALL SOUND(100,N,0)
2150 NEXT N
2160 CALL HCHAR(24,1,32,32)
2170 K$="LOSE ANOTHER LIFE"
2180 Z=24
2190 GOSUB 1350
2200 FOR N=196 TO 230 STEP 8
2210 CALL SOUND(100,N,0)
2220 NEXT N
2230 CALL HCHAR(24,1,32,3)
2240 P=P-1
2250 IF P=0 THEN 2290
2260 CALL HCHAR(X,9,120)
2270 E=104
2280 GOTO 570
2290 CALL CLEAR
2300 CALL SCREEN(2)
2310 CALL COLOR(1,16,16)
2320 FOR N=5 TO 9
2330 CALL COLOR(N,9,16)
2340 NEXT N
2350 K$="GUESS YOU RAN"
2360 Z=10
2370 GOSUB 1350
2380 K$="OUT OF LIVES"
2390 Z=12
2400 GOSUB 1350
2410 INPUT "DO YOU WANT TO PLAY
AGAIN ":T$
2420 IF T$="Y" THEN 100
2430 END
```

Have you got an appetite for numbers? Then this is the game for you — or rather for your snake. You haven't got a snake? Never fear — you'll find one in the Number Patch.

You control a snake with a big appetite. For numbers. But only the right numbers. He's a bit of a gourmet this snake, he'll only eat the numbers 0, 1, 2, 3, 4, 5 and 6. If he eats a 7, 8 or 9 then he'll suffer a fatal case of food poisoning. You'll also come to a sticky end if you run into the wall of the number patch — or if you start eating your own tail!

Full instructions are included in the program as an aid to your eating habits. We hope it all adds up to a good game! Bon Appetite!

**RUNS ON A PET IN 4K**

```
100 PRINT"""GOSUB880:HI=0
110 REM ***** SET UP VARIABLES *****
120 K=18:SC=0:LV=0
130 N=0:A1=0:A2=0:A3=0:A4=0:A5=0:A6=0:J=(K/3)*2
140 GOSUB580
150 REM ***** MOVEMENT *****
160 A=32768+540:X=251
170 POKEA,X:POKEA1,81
180 IFPEEK(166)=28THENN=40:X=236
190 IFPEEK(166)=36THENN=-40:X=254
190 IFPEEK(166)=24THENN=1:X=236
200 IFPEEK(166)=32THENN=-1:X=251
210 IFPEEK(166)=0THENGOTO170
220 Z=PEEK(A+N)
230 IFZ<32ORZ>54THENGOTO290
240 IFZ>47ANDZ<55THENGOSUB480
250 A6=A5:A5=A4:A4=A3:A3=A2:A2=A1:A1=A:A=A+N
260 POKEA6,32:GOTO170
270 REM ***** DEATH SCENE *****
280 M=0:IFSC>HITHENHI=SC:M=1
290 PRINT"YOU JUST KILLED YOURSELF, TWIT !!!"
300 IFZ=91THENGOSUB1130
310 IFZ=102THENGOSUB1160
320 IFZ>54ANDZ<58THENGOSUB1190
330 PRINT"YOUR SCORE =";SC
340 PRINT"HIGH SCORE =";HI
350 IFM=1THENGOTO400
360 PRINT"HARD LUCK, YOU DIDN'T BEAT THE HIGH"
370 PRINT"SCORE !*! BUT THIS DOESN'T MEAN YOU'RE"
380 PRINT"A TOTAL FAILURE !!":GOTO410
390 PRINT"WELL DONE, YOU GOT THE HIGH SCORE !*!?!"
400 PRINT"PRESS I TO SEE THE INSTRUCTIONS AGAIN !"
410 PRINT"PLAY THE ACTUAL GAME AGAIN (Y/N)"
420 GETA$:IFA$="Y"THENPRINT"":GOTO120
430 IFA$="I"THENGOSUB880:GOTO120
440 IFA$="N"THENEND
450 GOTO430
```

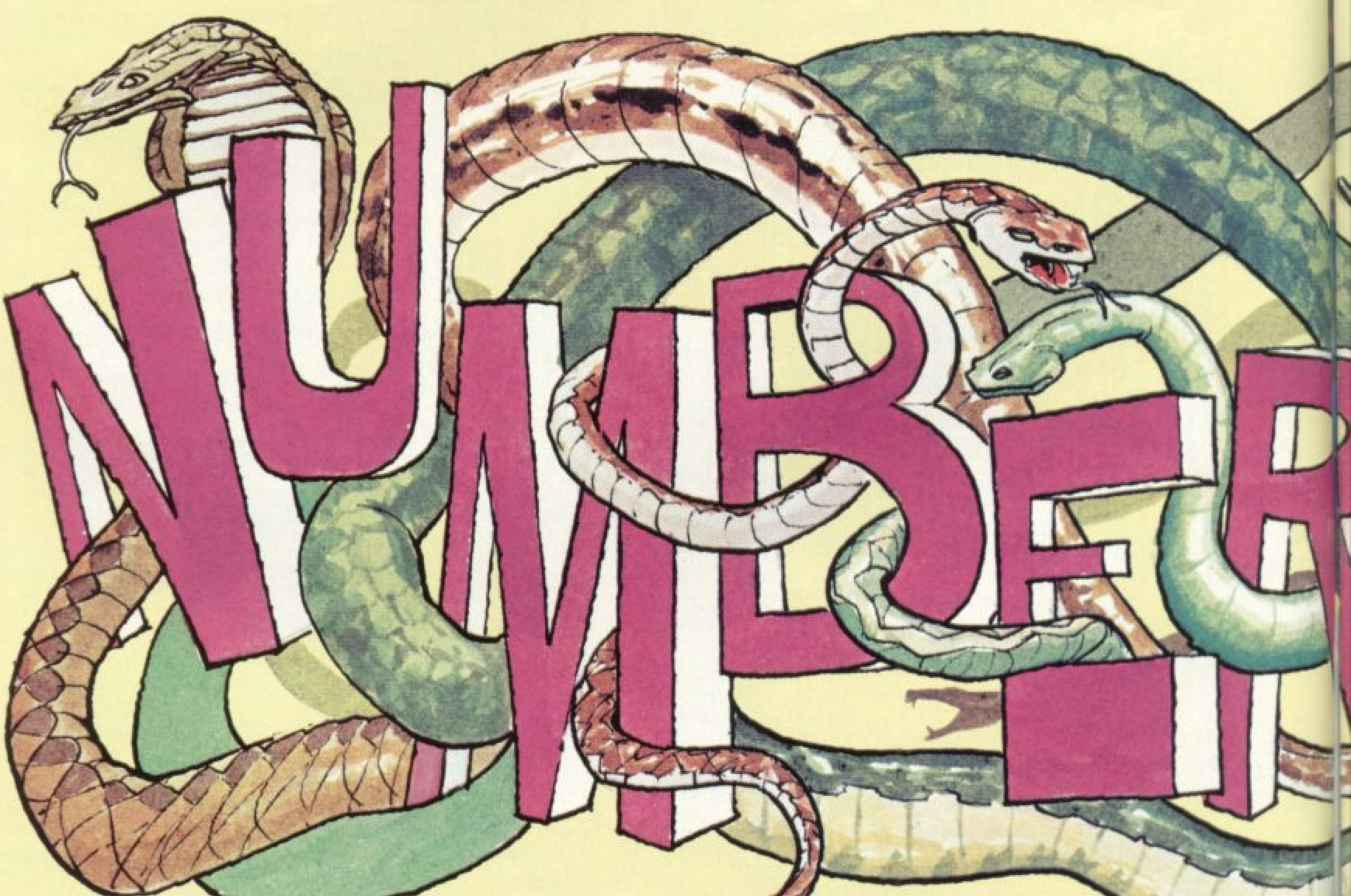


Illustration: Jon Davis

```
470 REM ***** SCORING *****
480 I=I-1:IFI=0THENGOTO520
490 SC=SC+(Z-48):PRINT"■■SCORE =";SC
500 RETURN
510 REM ***** ONTO NEXT LEVEL *****
520 PRINT"■CONGRATULATIONS, YOU'VE GRADUATED ONTO"
530 PRINT"■THE NEXT LEVEL !#!#?!"
540 FORI=1TO1000:NEXTI:LV=LV+1
550 IFLV=5THENLV=0:K=K+12:SC=SC+200
560 GOSUB740:GOTO130
570 REM ***** DRAW SCREEN *****
580 FORI=1TO40
590 POKE32767+I,102:POKE33767-40+I,102
600 NEXTI
610 FORI=32768TO33767STEP40:POKEI,102:POKEI+39,102:NEXTI
620 FORI=1TOJ
630 P=INT(7*RND(1))+48
640 O=INT(1000*RND(1))+32768:IFO=32768+540THEN640
650 IFPEEK(O)<>32THEN640
660 POKEO,P:NEXTI
670 FORI=1TO(K/3)
680 P=INT(3*RND(1))+55
690 O=INT(1000*RND(1))+32768:IFO=32768+540THEN690
700 IFPEEK(O)<>32THEN690
710 POKEO,P:NEXTI
720 PRINT"■■SCORE =";SC:RETURN
730 REM ***** SET UP LEVELS *****
740 PRINT"■":FORQ=0TOLV
750 ONQGOSUB770,790,820,840
760 NEXTQ:SC=SC+(25*LV):K=K+6:RETURN
770 PRINT"■":FORI=32787TO32968STEP40:POKEI,102:NEXTI
780 FORI=33747TO33567STEP-40:POKEI,102:NEXTI:RETURN
790 FORI=1TO19
800 POKE33247+I,102
810 POKE33276+I,102:NEXTI:RETURN
820 FORI=0TO10:POKE33262+I,102:NEXTI
830 FORI=33067TO33467STEP40:POKEI,102:NEXTI:RETURN
840 FORI=1TO20
```

```
850 O=INT(1000*RND(1))+32768
860 POKEO,102:NEXTI:RETURN
870 REM ***** INSTRUCTIONS *****
880 PRINT"  NUMBER PATCH...BY L.D.NICHOLS"
890 PRINT"
900 PRINT"■YOU ARE A SNAKE!! TO KEEP ALIVE YOU MUST"
910 PRINT"EAT NUMBERS, BUT THE RIGHT NUMBERS !!!"
920 PRINT"■THE RIGHT NUMBERS ARE 0,1,2,3,4,5 AND 6"
930 PRINT"■AND THE WRONG NUMBERS ARE 7,8 AND 9!!"
940 PRINT"■IF YOU EAT A RIGHT NUMBER IT WILL BE "
950 PRINT"■ADDED TO YOUR SCORE. IF YOU EAT A WRONG"
960 PRINT"■NUMBER, YOU WILL DIE (THEY DO SOMETHING"
970 PRINT"■TO YOUR DIGESTIVE SYSTEM).YOU WILL ALSO"
980 PRINT"■DIE IF YOU HIT THE WALL OR IF YOU TRY TO "
990 PRINT"EAT YOURSELF !!!"
1000 PRINT"■PRESS THE ■SPACE■ BAR TO CONTINUE"
1010 WAIT59410,4,4
1020 PRINT"■THE SYMBOLS ARE -"
1030 PRINT"■■ = PIECE OF WALL"
1040 PRINT"■■■ = YOUR HEAD + A PIECE OF YOUR BODY"
1050 PRINT"■AND A NUMBER IS A NUMBER !!!"
1060 PRINT"■TO CONTROL YOURSELF -"
1070 PRINT"■           (UP)■■■■■■■"
1080 PRINT"(LEFT) Z ■■■■■■■ X (RIGHT)"
1090 PRINT"              ■■■■■■■(DOWN)"
1100 PRINT"■PRESS THE ■SPACE■ BAR TO PLAY THE GAME"
1110 WAIT59410,4,4:PRINT"■":RETURN
1120 REM***** MESSAGES *****
1130 PRINT"■BY THE WAY, YOU DIED BY TRYING TO EAT"
1140 PRINT"■YOURSELF, YOU FOOL !!!"
1150 RETURN
1160 PRINT"■DON'T CHEW THE WALL, YOU KNOW IT'S NOT"
1170 PRINT"■GOOD FOR YOU !!!"
1180 RETURN
1190 PRINT"■BUT DON'T BLAME ME IF YOU INSIST ON "
1200 PRINT"■EATING ALL THE WRONG NUMBERS !!!"
1210 RETURN
```

**BY L. D. NICHOLS**



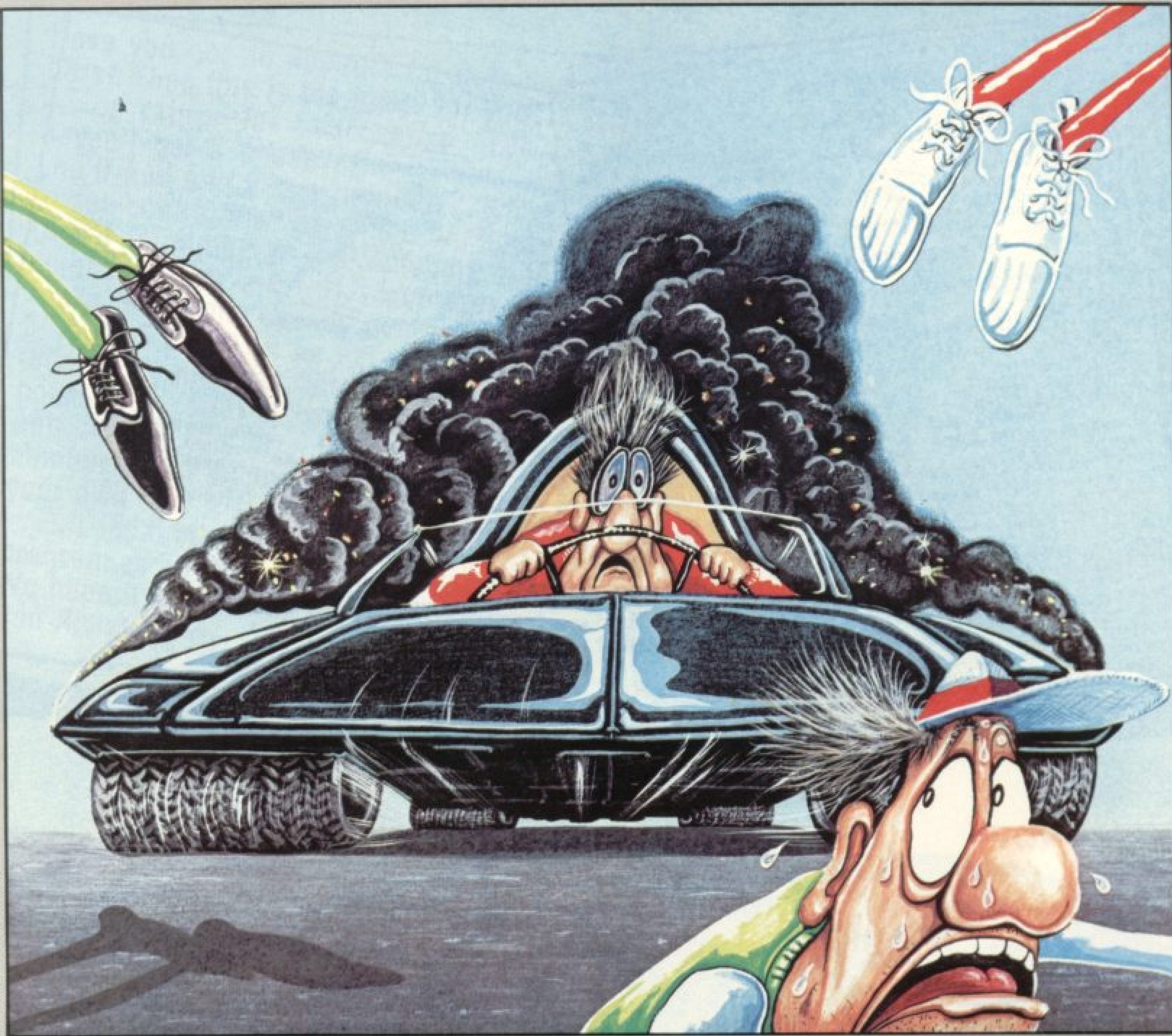


Illustration: Dorian Cross

```
5 LET X$=""
6 LET T=0
7 GOSUB 4000
10 CLS
11 PRINT "                                "
20 PRINT "                                "
30 PRINT "                                "
40 PRINT "                                "
50 PRINT "                                "
60 PRINT "                                "
70 PRINT "                                "
80 PRINT "                                "
90 PRINT "                                "
100 PRINT "                                "
110 PRINT "                                "
120 PRINT "                                "
130 PRINT "                                "
140 PRINT "                                "
150 PRINT "                                "
160 PRINT "                                "
170 PRINT "                                "
180 PRINT "                                "
190 PRINT "                                "
200 PRINT "                                "
210 PRINT "                                "
220 PRINT "                                "
230 LET A=PEEK 16396+256*PEEK 1
6397+1
235 IF LEV=2 THEN GOSUB 5000
240 LET A=A+641
250 LET T$=INKEY$
251 IF T$<>"" AND T$<>"0" AND T
$<>"9" THEN LET X$=T$
255 POKE A,0
260 IF X$="6" THEN LET A=A+1
270 IF X$="7" THEN LET A=A-33
280 IF X$="6" THEN LET A=A+33
290 IF X$="5" THEN LET A=A-1
300 IF PEEK A=134 THEN GOTO 200
0
305 LET T=T+1
310 IF PEEK A=128 THEN GOTO 700
315 IF PEEK A=8 THEN GOTO 6000
320 IF X$="7" OR X$="6" THEN PO
KE A,45
322 IF X$="8" OR X$="5" THEN PO
KE A,46
325 IF INKEY$="P" THEN LET X$="
"
326 IF X$="" THEN POKE A,46
```

PROGRAM NOTES:
11-220: Print track
250-330: Main loop
700-880: Crash display
890-930: Prompt user with "Another go?"
1000-1260: Spectacular start display
1220: Makes the computer pause
2000-2140: Finish the course alive display
3000-3060: Prints "CHEAT" if user goes backwards over the start line
4000-4250: Prompt user with "Enter Level"
5000-5040: Print random oil slicks on the track (level 2 only)
6000-6140: Print "SKID" if you hit an oil slick
9000-9020: Save the program so that it can run automatically on loading.

VARIABLES:
X$ — Direction car is travelling (5, 6, 7 or 8)
T — Time
A — Position of car in D-FILE
LEV — Level (1 or 2)
T$ — Key being pressed
X — Multi purpose variable used all through the program
G — Pause (only used in line 870)
Y — COS (32/X) — used as a pause
Z1 — Random position of oil slick (Z1 + D-FILE)
Z — Number of oil slicks (line 5000 — FOR/NEXT loop)
S$ — "DODGEM". Print S$ would give "DODGE", because it is used for SAVEing the program.

**Rev-up your sleek black racer for a challenging time-trial. All you have to do is guide your car around the circuit in the fastest possible time.**

**To make the challenge harder the author has built in two skill levels.**

**The first simply asks you to negotiate the twists and turns of the circuit, but the second introduces an oil slick hazard, which you must avoid at all costs!**

**The slicks appear at random positions on the screen and if you hit one the computer will flash up a SKID! message.**

**Your car is represented by an 'T' when it is going left or right, and an 'H' going up or down. Control keys are '5'-left, '6'-down, '7'-up, '8'-right and '0'-stop. When the car is moving it will continue in that direction until another key is pressed.**

**When this program has been entered, to save it on to cassette, type 'GOTO 9000'. This way it will run automatically on loading, and will print out the spectacular starting display.**

RUNS ON A SINCLAIR ZX81 IN 4K

# DODGEMS

BY MATTHEW WILKES

```
330 GOTO 250
700 PRINT AT 0,0;
705 FAST
710 FOR X=0 TO 6
720 PRINT AT X,15;"▌"
730 PRINT AT X,(X+2);"▚"
740 PRINT AT X,(29-X);"▞"
750 NEXT X
760 PRINT
770 PRINT TAB 4;"▒▒▒▒▒ ▒   ▒  ▒▒▒
▒▒▒▒▒ ▒ ▒"
780 PRINT TAB 4;"▒     ▒▒▒ ▒▒▒ ▒
▒ ▒    ▒ ▒"
790 PRINT TAB 4;"▒▒▒▒▒ ▒ ▒ ▒ ▒▒▒▒
▒ ▒▒▒▒▒ ▒▒▒▒"
800 PRINT TAB 7;"▒ ▒   ▒ ▒  ▒
▒ ▒ ▒"
810 PRINT TAB 4;"▒▒▒▒▒ ▒    ▒ ▒
▒ ▒▒▒▒▒ ▒ ▒"
820 FOR X=14 TO 21
830 PRINT AT X,15;"▌"
840 PRINT AT X,(22-X);"▞"
850 PRINT AT X,(X+9);"▚"
860 NEXT X
865 SLOW
867 POKE A,CODE "▒"
870 FOR G=1 TO 100
880 NEXT G
890 PRINT AT 21,0;"DO YOU WANT
ANOTHER GO ?"
900 IF INKEY$="" THEN GOTO 910
910 IF INKEY$="Y" THEN RUN
915 IF INKEY$="N" THEN GOTO 940
920 LET X$=""
930 GOTO 910
940 CLS
950 PRINT AT 10,10;"STOPPED"
960 STOP
1000 CLS
1010 PRINT "▒▒   ▒▒  ▒▒   ▒▒
▒▒▒ ▒  ▒"
1020 PRINT "▒ ▚ ▒ ▒ ▒ ▚ ▒ ▒
▒ ▒▒▒▒▒"
1030 PRINT "▒  ▒ ▒  ▒ ▒  ▒ ▒
▒ ▒ ▒"
1035 PRINT "▒  ▒ ▒  ▒ ▒  ▒ ▒ ▒
▒▒ ▒ ▒"
1040 PRINT "▒  ▒ ▒  ▒ ▒  ▒ ▒ ▒
▒ ▒ ▒"
1050 PRINT "▒ ▞ ▒ ▒ ▒ ▞ ▒ ▒ ▞
▒ ▒ ▒"
1060 PRINT "▒▒   ▒▒  ▒▒   ▒▒
▒▒▒ ▒ ▒"
1070 PRINT
1080 PRINT "  DODGEM  "
1090 PRINT "  DODGEM  "
1100 PRINT "  DODGEM  "
1110 PRINT "  DODGEM  "
1120 PRINT
1130 PRINT "DODGEM"
1140 PRINT
1150 PRINT "(C)COPYRIGHT 1982,"
1155 PRINT
1160 PRINT "▚▚▚▚M.WILKES▚▚▚▚▚"
1165 PRINT
1170 PRINT "IN BASIC."
1180 PRINT AT 21,0;"PRESS <
 > TO START"
1185 FOR X=1 TO 5
1186 NEXT X
1190 LET A$="NEWLINE"
1200 FOR X=1 TO 7
```

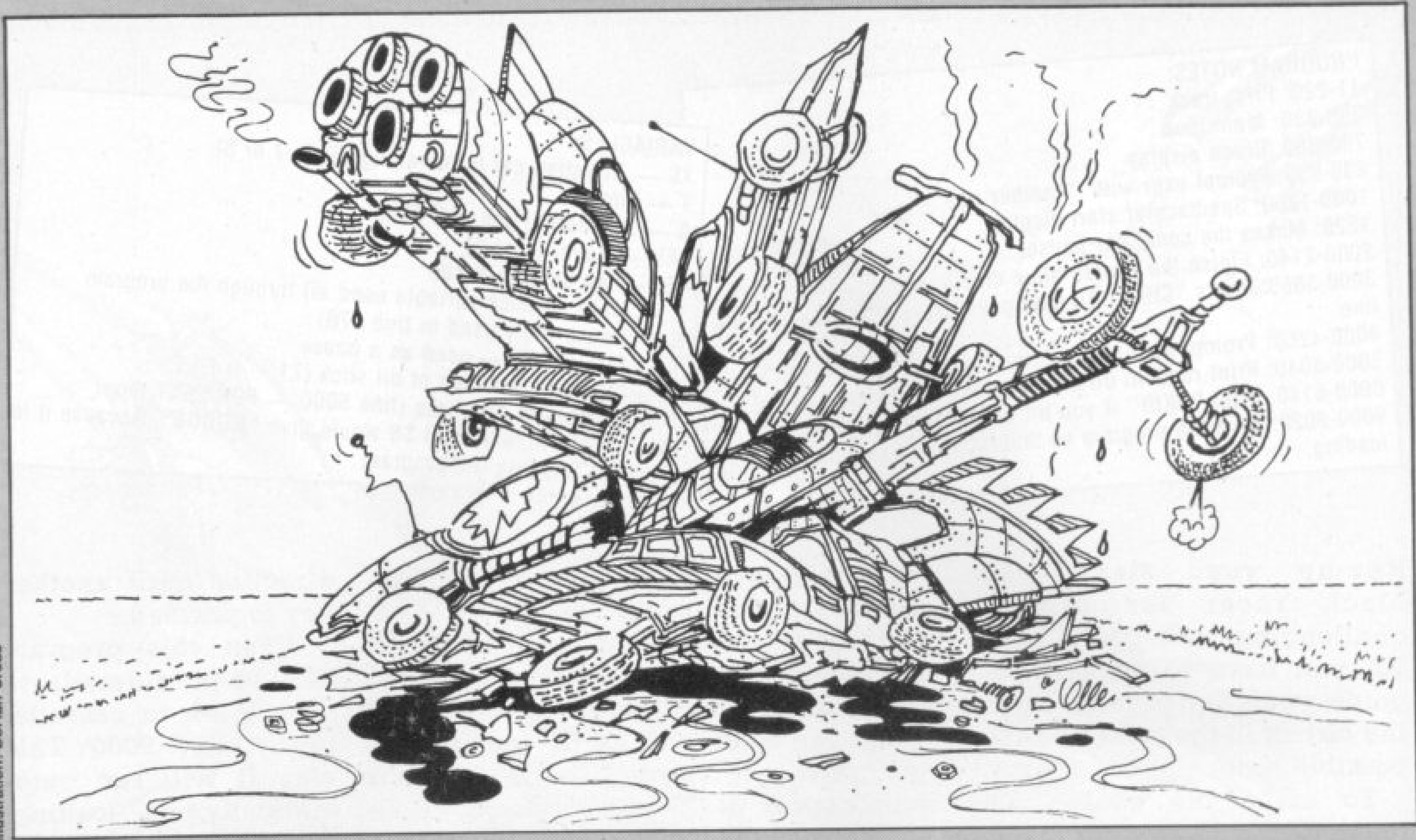
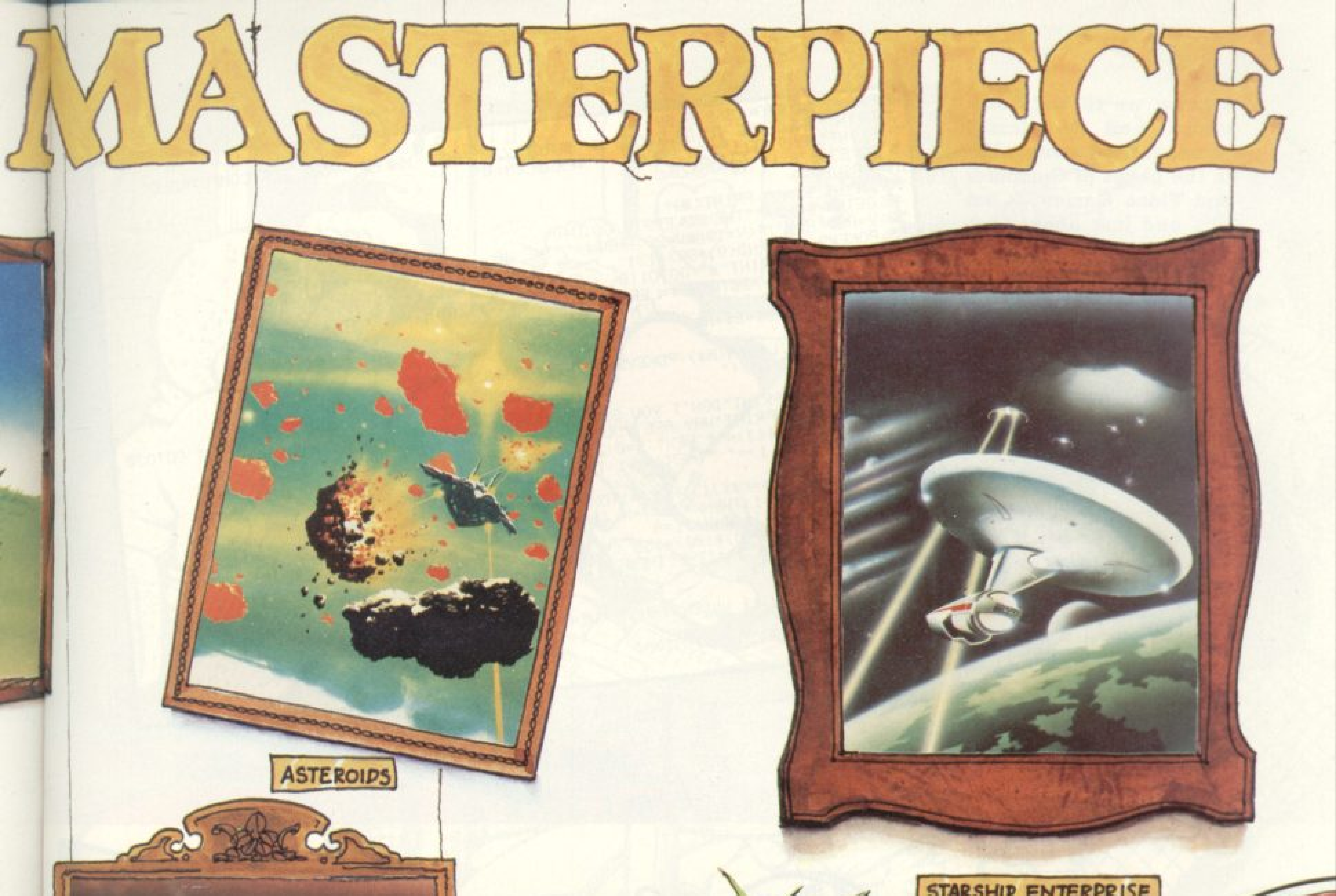


Illustration: Dorian Cross

```
1205 IF INKEY$=CHR$ 118 THEN RUN
1210 PRINT AT 21,6+X;A$(X)
1220 LET Y=INT (COS (32/X))
1225 NEXT X
1230 PRINT AT 21,7;"NEWLINE"
1240 FOR X=1 TO 10
1245 IF INKEY$=CHR$ 118 THEN RUN

1250 NEXT X
1255 PRINT AT 21,7;"              "
1256 FOR X=1 TO 5
1257 NEXT X
1260 GOTO 1190
2000 IF X$<>"5" THEN GOTO 3000
2010 CLS
2020 PRINT " 000  0    0 0 0 0"
2030 PRINT "0    0 0  0  0 0 0"
2040 PRINT "0    0 0 0   0 0 0"
2050 PRINT "0    0 00    0 0 0"
2060 PRINT "0    0 0 0   0 0 0"
2070 PRINT "0    0 0  0"
2080 PRINT " 000  0    0 0 0 0"
2090 PRINT
2100 PRINT "YOU MADE IT ALIVE,"
2110 PRINT "I AM SUPRISED."
2120 PRINT
2130 PRINT " YOUR TIME = ";T
2140 GOTO 890
3000 PRINT AT 0,0;
3010 PRINT "  CCCC H   H EEEEE
AAA  TTTTT O"
3020 PRINT " C     H   H E     A
   A   T   O"
3030 PRINT " C     HHHHH EEE   A
AAAA   T   O"
3040 PRINT " C     H   H E     A
   A   T   "
3050 PRINT "  CCCC H   H EEEEE A
   A   T   O"
3060 GOTO 890
4000 CLS
4010 PRINT "EEEEE N   N TTTTT EE
EEE RRRR"
4020 PRINT "E     NN  N   T   E
    R   R"
4030 PRINT "EEE   N N N   T   EE
E   RRRR"
4040 PRINT "E     N  NN   T   E
    R R"
4050 PRINT "E     N   N   T   E
    R  R"
4060 PRINT "EEEEE N   N   T   EE
EEE R   R"
4070 PRINT
4075 PRINT
4080 PRINT "L     EEEEE V   V EE
EEE L"
4090 PRINT "L     E     V   V E
    L"
4100 PRINT "L     EEE    V V  EE
E   L"
4110 PRINT "L     E      V V  E
    L"
4120 PRINT "L     E       V   E
    L"
4130 PRINT "LLLLL EEEEE   V   EE
EEE LLLLL"
4140 PRINT
4150 PRINT "1 = NORMAL TRACK,"
4160 PRINT
4170 PRINT "2 = OIL SLICKS."
4180 PRINT
4190 PRINT "LEVEL = ";
4200 INPUT LEV
4205 IF LEV<>1 AND LEV<>2 THEN G
OTO 4000
4210 PRINT LEV
4220 PRINT
4230 PRINT "PRESS ANY KEY TO STA
RT GAME."
4240 IF INKEY$="" THEN GOTO 4240
4250 RETURN
5000 FOR Z=1 TO INT (RND*10)+10
5010 LET Z1=INT (RND*700)
5020 IF PEEK (A+Z1)=0 THEN POKE
A+Z1,8
5030 NEXT Z
5040 RETURN
6000 CLS
6010 PRINT " SSS  K   K IIIII DD
"
6020 PRINT "S     K  K    I   D
D"
6030 PRINT "S     K K     I   D
 D"
6040 PRINT " SSS  KK      I   D
 D"
6050 PRINT "    S K K     I   D
 D"
6060 PRINT "S   S K  K    I   D
D"
6070 PRINT " SSS  K   K IIIII DD
"
6080 PRINT "           "
6090 PRINT "               "
6100 PRINT " OIL SLI           "
6110 PRINT "               "
6120 PRINT "               "
6130 PRINT "               "
6140 GOTO 890
9000 LET S$="DODGEM"
9010 SAVE S$
9020 RUN 1000
```


EVERY ONE A M
ORBITER
ALIEN DROPOUT
CYBER RATS
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I know we've had some weird and wonderful games tucked away within the pages of Computer and Video Games — but this one just about tops the lot.

It's the ideal pastime for those of you who like talking about your illnesses, or trips to hospital, or visits to the doctor . . . that sort of stuff. In fact you could call this *C&VG*'s contribution to the health of the nation.

You may not believe it, but here's a brief rundown of what you'll get if you feed this into your Vic. Are you sitting comfortably? Then I'll begin. You are sitting in a doctor's

```
1 PRINT"": POKE36879,59
2 PRINT"WELCOME TO DR.VIC'S   SURGERY.PLEASE  MAKE  YOURSELF COMFOTABLE"
3 PRINT"AND TELL HIM YOUR      PROBLEM!"
5 POKE36878,15:V9=36876
10 GOSUB380
30 L$=H$:B$="":PRINT"J";
40 GETH$:IFH$=""THENPOKEV9,0:GOTO40
50 V=ASC(H$):IF(V=13ORV=20)ANDB$=""THEN40
55 POKEV9,INT(RND(0)*80)+131
60 IFV=13THENPRINT"":GOTO110
70 PRINTH$;:IFV=20THENB$=LEFT$(B$,LEN(B$)-1):GOTO40
80 IFV=44THENH$=" "
90 IFV<>39THENB$=B$+H$
100 GOTO40
110 H$=B$+" ":L=LEN(H$):POKEV9,0:IFTI$<"000250"GOTO130
120 PRINT"TIME UP!!"
125 GOTO1000
130 IFL>30THENPRINT"DON'T YOU SAY LONG SENTECES!":PRINT"PLEASE EXPLAIN!":GOTO30
140 IFH$=L$THENPRINT"WHY ARE YOU REPEATING YOURSELF?":GOTO30
160 FORJ=1TOE:T$(J)="":NEXT:X=0:Z=1:FORJ=1TOL
170 IFMID$(H$,J,1)=" "THENX=X+1:T$(X)=MID$(H$,Z,J-Z):Z=J+1
180 NEXT
190 FORJ1=1TOA:K$=K$(J1):FORJ=1TOX:T$=T$(J)
200 IFK$=T$+T$(J+1)THENK=J1:J=X:J1=A
210 IFK$=T$THENK=J1:J=X:J1=A:GOTO220
215 POKEV9,INT(RND(0)*100)+155
220 IFRIGHT$(T$(X),3)="BYE"THENSD=1
225 NEXTJ,J1
230 POKEV9,0
240 IFK=0THENPRINT"I UNDERSTAND":PRINT"PLEASE CONTINUE":GOTO360
250 PRINTR$(K)
260 IFSD=1THENPOKEV9,0:GOTO1000
360 K=0:GOTO30
```

# Dr. Vic

**RUNS ON AN UNEXPANDED VIC-20**

**BY L. BRAIN**






surgery. Let's call our friendly GP Doctor Vic.

All you have to do is tell the good doctor your problems. Then the doctor will tell you what's wrong with you.

If you've programmed this in I've got a good idea what's wrong — but we don't want to lose any readers so I won't say anything!

And that's about it really—except you'll probably die laughing at the dear doctor's diagnosis! If you are feeling down in the dumps then the C&VG doctor will soon have you in stitches . . .

**Program notes:**
Lines; 1-400:main loop. 480-500:key words the computer responds to. 600-760: responses to your sentences. 1000-1060:end of program routine and diagnosis.

Illustrations: Terry Rogers

```
380 A=40:B=40:DIMK$(A),R$(B):TI$="000000"
390 FORJ=1TOA:READK$(J):NEXT
395 FORJ=1TOA:READR$(J):NEXT
400 RETURN
480 DATA IM,IAM,ICANT,IWONT,IDONT,WANTA,WANTTO,IFEEL,CANI,CANTI,CANYOU,DONTYOU,
AREYOU
490 DATA WHO,HOW,WHAT,WHERE,WHEN,WHY,YOUARE,YOURE,YOUR,YOU,MY,SORRY,YES,NO,HATE
,LOVE
500 DATA THINK,GOOD,FRIEND,MONEY,IF,GREAT,COMPUTER,FOOD,SHUTUP,GOODBYE,BYE
600 DATA DID YOU THINK I'D BE  SHOCKED TO HEAR THAT?,HOW LONG HAVE YOU BEENLIKE
THAT?
610 DATA ONE NEVER KNOWS UNLESSONE TRIES!,IS THAT WHY YOU WANT  MY HELP?
620 DATA DO YOU WISH YOU COULD?,BUT WHAT IF YOU NEVER GOT IT?,WHY DO YOU WANT T
O DO IT?
630 DATA WHAT DO THESE FEELINGSSUGGEST TO YOU?,DO YOU REALLY WANT TO DO IT?
640 DATA WOULD IT HELP IF YOU COULD,WOULD IT HELP YOU?
650 DATA WHY ARE YOU CURIUIOUS TO KNOW IF I DO?,CAN YOU EXPLAIN WHY   YOU ASKED
THAT?
660 DATAWHY DO YOU ASK THAT?,IS THAT OF INTREST TO YOU?,PLEASE EXPLAIN!
665 DATA CAN YOU EXPLAIN WHY   YOU ASKED THAT?,DO YOU REALLY WANT TO KNOW?
670 DATA CAN YOU CLARIFY THAT  QUESTION?,WHY BRING ME INTO IT?
675 DATA PERHAPS IT'S ONLY IN  YOUR IMAGINATION?
680 DATA "I THINK YOU ARE          SUBCONCIOUSLY TALKING ABOUT YOURSELF"
685 DATA HAVE YOU DEVELOPED AN INFATUATION FOR ME?,REALLY!?
690 DATA WHY ARE YOU APOLOGIING?,WHAT MAKES YOU SAY YES?
700 DATA I THINK YOU REALLY     WANTED TO SAY YES!,HAVE YOU ALWAYS HAD   THIS HA
TE
710 DATA HOW REAL IS THIS LOVE?,YOU DON'T SEEM SURE!
720 DATA CAN YOU ELABORATE ON  THAT?,DOES THE SUBJECT OF   FRIENDS DISTURB YOU?
730 DATA WHY IS MONEY IMPORTANTTO YOU?,YOU DON'T SEEM SURE!
740 DATA WHAT DO YOU MEAN BY   GREAT? WHY DO COMPUTERS COME TO MIND?
750 DATA WHAT FOOD DO YOU LIKE MOST?,WHY DO YOU WANT ME TO SHUTUP?
760 DATA THAT WILL BE TEN POUNDPLEASE,THANK YOU FOR TALKING TO ME
1000 DATA PARANOID,AGNOSTIC,A PARRATOR,A GLUTTON,A BIT SENTENTIOUS,A SCATOPHAGO
US
1010 FORV=1TO6:READX$(V):NEXT
1020 LETQ=INT(RND(0)*6)+1
1030 PRINT"MY DIAGNOSIS IS YOU ARE"
1040 PRINT"     "X$(Q)
1045 CLR
1050 PRINT"NEXT PATIENT PLEASE"
1060 GOTO2
```

```
1090 REM
1100 REM The routine at lines 2440-2540          were found on page 432 of the
              BBC User Guide
1110 REM
1120 ON ERROR GOTO 2550
1130 *TV255
1140 MODE 1
1150 VDU 19,2,6,0,0,0
1160 VDU 19,3,2,0,0,0
1170 VDU 23,230,16,16,146,254,254,254,254,130
1180 VDU 23,231,1,18,52,120,254,60,24,16
1190 VDU 23,232,252,120,120,127,120,120,252,0
1200 VDU 23,233,16,24,60,254,120,52,18,1
1210 VDU 23,234,65,127,127,127,127,73,8,8
1220 VDU 23,235,8,24,60,127,30,44,72,128
1230 VDU 23,236,0,63,30,30,254,30,30,63
1240 VDU 23,237,128,72,44,30,127,60,24,8
1250 VDU 23,238,0,60,66,90,90,66,60,0
1260 VDU 23,239,0,0,0,8,0,0,0,0
1270 PRINT:PRINT:COLOUR 1
1280 PRINT"                    TANK BATTLE"
1290 PRINT:PRINT"The object of the game is to blow up     your opponents tank"
1300 COLOUR 3
1310 PRINT:PRINT"The control keys are:"
1320 PRINT:COLOUR 1
1330 PRINT"                       ";CHR$(230);
1340 COLOUR 2:PRINT"              ";CHR$(230)
1350 COLOUR 3
1360 PRINT
1370 PRINT"Clockwise               D            :"
1380 PRINT"Anti clockwise          A            L"
1390 PRINT"Forward                 S            ;"
1400 PRINT"Fire                    W            P"
1410 PRINT:PRINT"Good luck"
1420  PRINT:PRINT"Hit ";
1430 COLOUR 1:PRINT"RETURN"
1440 INPUT V$
1450 COLOUR3
1460 CLS
1470 PRINT:PRINT:PRINT
1480 PRINT"Enter number of trees.(1-200)"
1490 INPUT NT
1500 IF NT>201 THEN GOTO 1480
1510 PRINT"Enter'1'for curvey shells"
1520 INPUT C%
1530 PRINT "Enter'1'to be able to blow up trees."
1540 INPUT D%
1550 CLS
1560 VDU 23;8202;0;0;0
1570 COLOUR 3
1580 FOR N=0 TO 39
1590 VDU 31,N,0:PRINTCHR$(238)
1600 VDU 31,N,29:PRINTCHR$(238)
1610 NEXT
1620 FOR N=0 TO 29
1630 VDU 31,0,N:PRINTCHR$(238)
1640 VDU 31,39,N:PRINTCHR$(238)
1650 NEXT
1660 FOR N=1 TO NT
1670 X=RND(39):Y=RND(29)
1680 A$=FNREADCH(X,Y)
1690 IF A$<>" " THEN GOTO 1670
1700 VDU 31,X,Y:PRINTCHR$(238)
1710 NEXT
1720 DIMC$(2):DIM A$(2):DIMF$(2):DIM S$(2):DIM X(2):DIM Y(2):DIM XX(2):DIM YY(2
):DIM P(2):DIMU(2):DIM Q(8):DIM R(8)
1730 C$(1)="D":A$(1)="A":F$(1)="S":S$(1)="W"
1740 C$(2)=":":A$(2)="L":F$(2)=";":S$(2)="P":X(1)=5:Y(1)=25:Y(2)=5:X(2)=35:XX(1
)=0:XX(2)=0:P(1)=1:P(2)=5:Q(1)=0:Q(2)=1:Q(3)=1:Q(4)=1:Q(5)=0:Q(6)=-1:Q(7)=-1:Q(8
)=-1
1750 R(1)=-1:R(2)=-1:R(3)=0:R(4)=1:R(5)=1:R(6)=1:R(7)=0:R(8)=-1:PP=0
1760 SOUND 1,0,5,2
1770 FOR N=1 TO 2
1780 COLOUR N
1790 VDU 31,X(N),Y(N):PRINTCHR$(229+P(N))
1800 NEXT N
1810 REM
1820 T$=INKEY$(0)
1830 *FX15,1
1840 FOR N=1 TO 2
1850 IF N=1 THEN M=2 ELSE M=1
1860 COLOUR N
1870 IF T$<>C$(N) THEN GOTO 1910
1880 P(N)=P(N)+1:SOUND N+1,-6,20+N*2,3
1890 IF P(N)=9 THEN P(N)=1
1900 VDU 31,X(N),Y(N):PRINTCHR$(229+P(N)):GOTO 2030
1910 IF T$<>A$(N) THEN GOTO 1950
1920 P(N)=P(N)-1:SOUND N+1,-6,25+N*2,3
1930 IF P(N)=0 THEN LET P(N)=8
1940 VDU 31,X(N),Y(N):PRINTCHR$(229+P(N)):GOTO 2030
1950 IF T$<>F$(N) THEN GOTO 2030
1960 SOUND N+1,-10,N+1,3
1970 VDU 31 X(N),Y(N):PRINT" "
1980 D=P(N)
1990 X(N)=X(N)+Q(D):Y(N)=Y(N)+R(D)
2000 J$=FNREADCH(X(N),Y(N))
2010 IF J$<>" " THEN GOTO 2230
2020 VDU 31 X(N),Y(N):PRINTCHR$(229+P(N))
2030 IF T$=S$(N) AND XX(N)=0 THEN XX(N)=X(N)+Q(P(N)):YY(N)=Y(N)+R(P(N)):U(N)=P(
N):PP=1:SOUND 0,-15,4,1:SOUND 0,-15,6,2
```

Illustration: Jon Davis



# TA

**RUNS ON A BBC MODEL B**

**Sherman, Panzer, Churchill, Tiger — everyone's playing Tank Battle! Start making tracks to the battlefield by programming in this all-action wargame simulation. But don't get your turret in a twist otherwise you'll be suffering from shell-shock!**



# NK BATTLE

B I N 32K FOR TWO PLAYERS

BY J. WHITING

This is a version of that well known arcade armour-battle — one of the very first video games.

The object of the game is to destroy your opponents' tank — which is prowling the battlefield looking out for a chance to do the same to you!

You can alter the appearance of the battlefield each time you play by selecting the number of trees you want, from 1-200, and you can also introduce a new twist — or more accurately a curve — into the game.

By selecting the option at the start of each game you can add a nice curve to the path of your shells fired at the enemy.

Another option available to tank commanders is the exploding tree feature! Well, all that really happens is that trees blow up should a shell hit them . . .

What makes this game a testing challenge is that you can take on an opponent on equal terms and not have to battle with the superior intelligence of the computer.

Full instructions are included in the program, which provides a real challenge to would-be Field-Marshals.

# The thinking magazine for adventure gamers is here.

From a minor hobby, adventure gaming in Britain has now grown into a major enthusiast activity with players of all ages enjoying the drama, excitement and interest that it provides.

Launching this month, the new IMAGINE™ magazine will provide not only a comprehensive reference point but also a dynamic introduction to the adventure gaming world.

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* Aids and supportive information for all types of adventure game systems.
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```
2040 J$=FNREADCH(XX(N),YY(N))
2050 IF PP=1 AND J$=CHR$(238) THEN XX(N)=0
2060 PP=0
2070 IF XX(N)<>0 THEN GOSUB 2100
2080 NEXT N
2090 GOTO 1810
2100 FOR L= 1 TO 2
2110 IFC%=1 THEN U(N)=P(N)
2120 VDU 31,XX(N),YY(N):PRINT" "
2130 XX(N)=XX(N)+Q(U(N)):YY(N)=YY(N)+R(U(N))
2140 J$=FNREADCH(XX(N),YY(N))
2150 IF XX(N)=X(N) ANDYY(N)=Y(N) THEN GOTO 2230
2160 IF XX(N)=X(M) AND YY(N)=Y(M) THEN N=M :GOTO 2230
2170 IF J$<>CHR$(238) THEN GOTO 2200
2180 IF D%=1 AND XX(N)<>0 AND XX(N)<>39 AND YY(N)<>0
AND YY(N)<>29 THEN VDU 31.
XX(N),YY(N):PRINT" ":SOUND 2,-14,4,3
2190 XX(N)=0:SOUND 2,-14,4,3:RETURN
2200 VDU 31,XX(N),YY(N):PRINTCHR$(239)
2210 NEXT L
2220 RETURN
2230 SOUND 1,-13,50,1
2235 COLOUR N
2240 SOUND 0,-15,6,20
2250 SOUND 0,-12,6,2
2260 SOUND 0,-9,6,2
2270 SOUND 0,-7,6,1
2280 FOR NN=1 TO 15
2290 FOR LL=230 TO 237
2300 VDU 31,X(N),Y(N)
2310 PRINTCHR$(LL)
2320 NEXT LL
2330 NEXT NN
2340 FOR N=1 TO 3000:NEXT N
2350 VDU 31,1,30
2360  FOR N=1 TO 33:FOR NN=1 TO 30:NEXT NN:PRINT:NEXT N
2370 CLS
2380 PRINT:PRINT:PRINT"Do you want another game.(Y/N)"
2390 *FX15,0
2400 A$=GET$
2410 IF A$="Y" THEN RUN
2420 IF A$="N" THEN PRINT"See you later!":END
2430 GOTO 2390
2440 DEF FNREADCH(X,Y)
2450 LOCAL A%,LASTX,LASTY,C
2460 LASTX=POS
2470 LASTY=VPOS
2480 VDU 31,X,Y
2490 A%=135
2500 C=USR(&FFF4)
2510 C=C AND &FFFF
2520 C=C DIV &100
2530 VDU'31,LASTX,LASTY
2540 = CHR$(C)
2550 RUN
>P.

>P.LISTING COURTESY OF KING EDWARD V■II SCHOOL
```

Illustration: Jon Davis

# BBC, DRAGON & ATARI GAMES FROM QUICKSILVA

As part of the plan to expand their range to cover all the most popular personal computers QUICKSILVA are proud to introduce 3 new programs for the BBC Computer, plus a version of their popular "MINED-OUT" game for the Dragon and also a character generating program for the Atari 400/800 "MAGIC WINDOW".

## DRAGON

### MINED-OUT

**On Screen Features:** Tricky Mines, Damsels in distress, Mine detection indicator, 9 levels of minefield, Safe area, Progressive difficulty, Scoring, High score feature, Full instructions.
**Controls:** Up-Down-Left-Right.
**Special Features:** Bill the Worm, Bugs (mines with legs), Mine Spreaders, Action Replay.
Author: **Ian Andrew**

## ATARI 400/800

### MAGIC WINDOW

Define characters on 8 x 8 grid. Save to tape. Load from tape. Freely merges character sets into existing programs. Hex & Dec. O/Ps. Character manipulation: Mirror, rotate, invert, left, right, up, down, hold, wipe, cancel. Redefine whole character set. Also works in colour mode. Excellent examples supplied.
16K RAM or more.
Author: **M. Walker**

## BBC GAMES

### MUSIC PROCESSOR

Exploits your BBC music potential to its limits.
**Features:** Full push button operation, over 30 separate functions for recording, mixing, editing and sound effects etc. 4 channels, 5 octaves, 100,000 envelopes easily selected. Over 2000 note storage capacity. Ready made music files included.
Author: **Andy Williams**
For model A or B

### PROTECTOR

**Features:** Pods, monsters who kill on contact, mine laying UFO's, monsters increase in size as game progresses, new pods every 1000 pts., hyperspace function. Full colour hi-res graphics, sound. Joystick control.
For the model B with 16K + Joystick.
Author: **Andy Green**

### WIZARD

The lands most beautiful maidens are being sacrificed by an evil King. Can you be their saviour, fighting off hordes of evil demons armed only with your wand and magical powers. A most compulsive and original game with hi-res colour graphics and full sound.
Author: **A. R. Buckley**
For the model B with 32K









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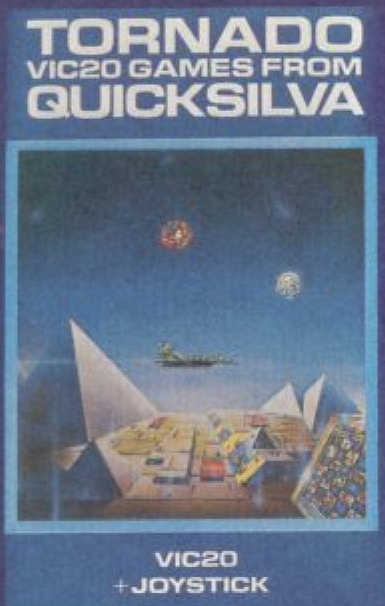
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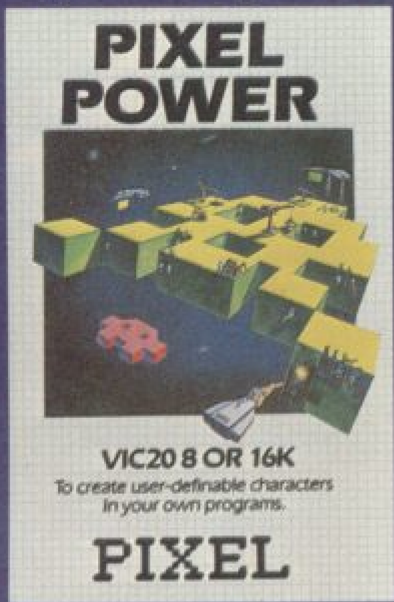
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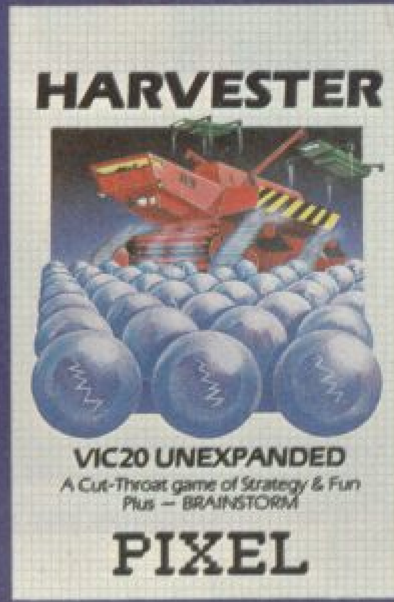



QUICKSILVA are proud to introduce Skyhawk written by Chartec for the VIC20 personal computer, many more amazing games to come!

**SKYHAWK:** Features Multi-colour, Hi-res 3-D Effect Graphics, Realistic Scrolling Landscape, Aircraft Landing and Refueling, Radar and Aircraft Status Displays, High Score Save, Full Sound Effects, Varying Formations of Attacking Aircraft, Extra Life at 3000 pts, Fuel Low Warning, Realistic Explosions. For the VIC20+3K or 8K expansion+Joystick.







For the VIC20 + 16K RAM.

**TORNADO:** In the midst of the Colony Wars ships are attacking you from the air, you have three types of ground base to bomb. Features: Full Colour, Hi-Res Graphics, Sound, Increasing Speed, High Score, Progressive Difficulty, Random Landscape, Explosions. By Chartec for the unexpanded VIC20+Joystick.

## PIXEL GAMES

### HARVESTER & BRAINSTORM

A cut-throat strategy game to reap valuable boosterspice around the planet Delta. Hi-Res Graphics and lots of fun for two to four players.
For the unexpanded VIC20.

### STARQUEST/ ENCOUNTER

A voyage of discovery and adventure in the cosmos. With the help of your onboard computer you seek a habitable planet amidst the perils of deep space.
For the VIC20 + 16K RAM.

### PIXEL POWER

A graphics workshop packed with useful features such as Create, Amend, Save and View Set.
For the VIC20 with 8K or more added RAM.

### SUBSPACE STRIKER & ZOR

It comes from out of nowhere and then vanishes back into the ether. With your deadly antimat torpedoes, you unleash havoc in the Federation's Spacelanes.
For the VIC20 + 16K RAM.

### TRADER

A trilogy of 16K programs that combine to give an epic 48K graphic adventure. As a galactic trader, you deal with some very bizarre customers indeed. Will you live to tell the tale? Supplied in a box with extensive instruction booklet.




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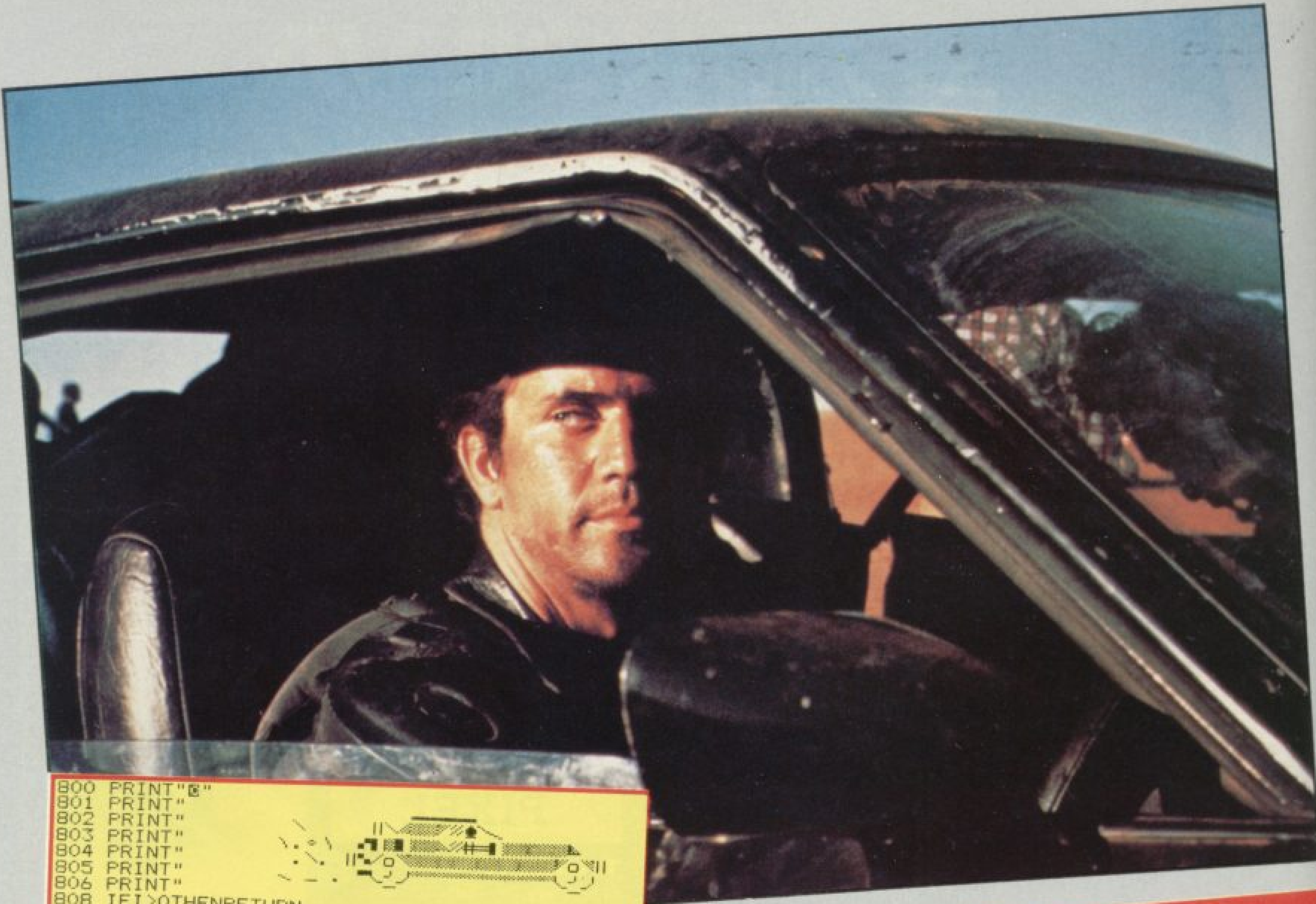
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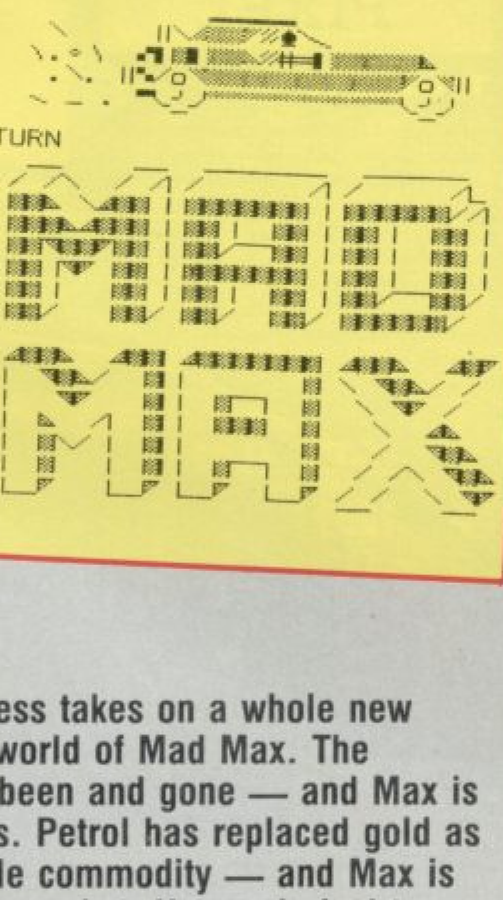
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```
800 PRINT"◘"
801 PRINT"
802 PRINT"
803 PRINT"
804 PRINT"
805 PRINT"
806 PRINT"
808 IFI>OTHENRETURN
810 PRINT"
812 PRINT"
814 PRINT"
816 PRINT"
818 PRINT"
820 PRINT"
822 PRINT"
824 PRINT"
826 PRINT
828 PRINT"
830 PRINT"
832 PRINT"
834 PRINT"
836 PRINT"
838 PRINT"
840 PRINT"
842 PRINT"
850 RETURN
```



**RUNS ON A SHARP MZ-80K**

**BY BASIL ZIMMO**

Motorway-madness takes on a whole new meaning in the world of Mad Max. The apocalypse has been and gone — and Max is king of the roads. Petrol has replaced gold as the most valuable commodity — and Max is out to corner the market. He needs fuel to maintain his position as a self-appointed 21st century traffic-warden, tracking down drivers who break the rules of the road — the kingdom of Mad Max.

You can become Max in this riotous road race. You receive a message that there is a petrol station which has managed to hang on to a stockpile of fuel. You leap into your supercharged vehicle and roar off through the bleak countryside. You race through deserted suburbs, over a bridge, through a farm, a barren forest and past a city before the petrol station comes into view.

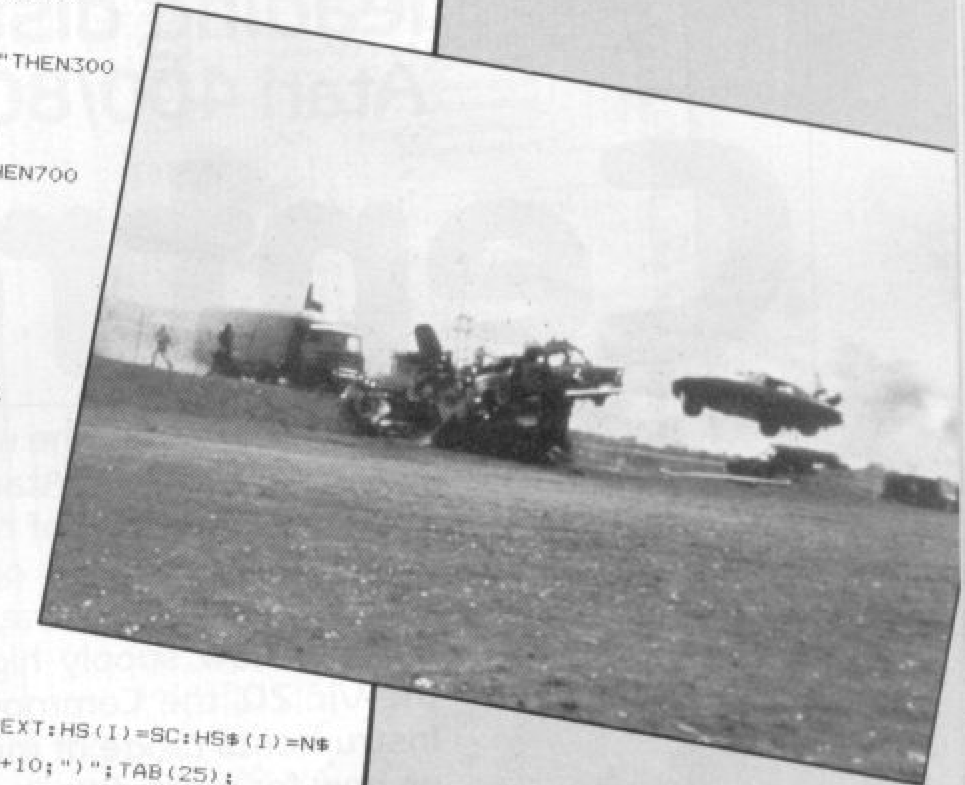
If you hit anything along the way — obstacles include the wrecks of cars that have attempted to reach the fuel, or if you go off the road, the game will end. The further along the road you get, the more points you collect. If you manage to reach the petrol and claim the fuel you'll get 5,000 points.

Keys A, D, W, and X control the action. If you want to make the game even more difficult try using the X key to move forward. That way less of the road is visible!

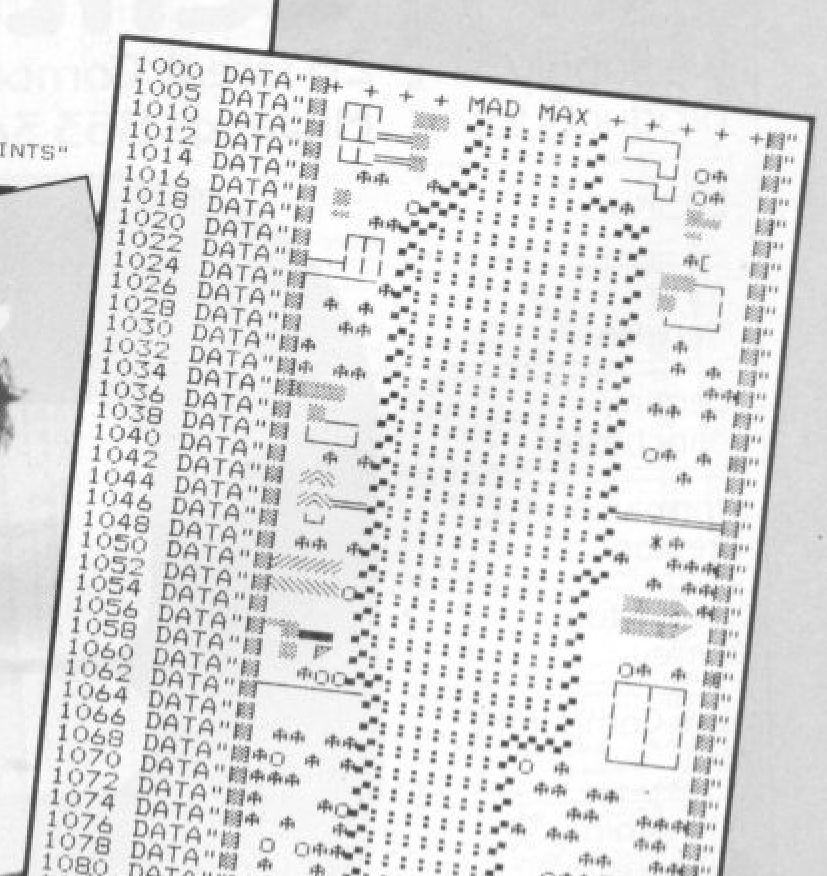
We know it's a long program to key in — but the game is extremely addictive and well worth all the effort!

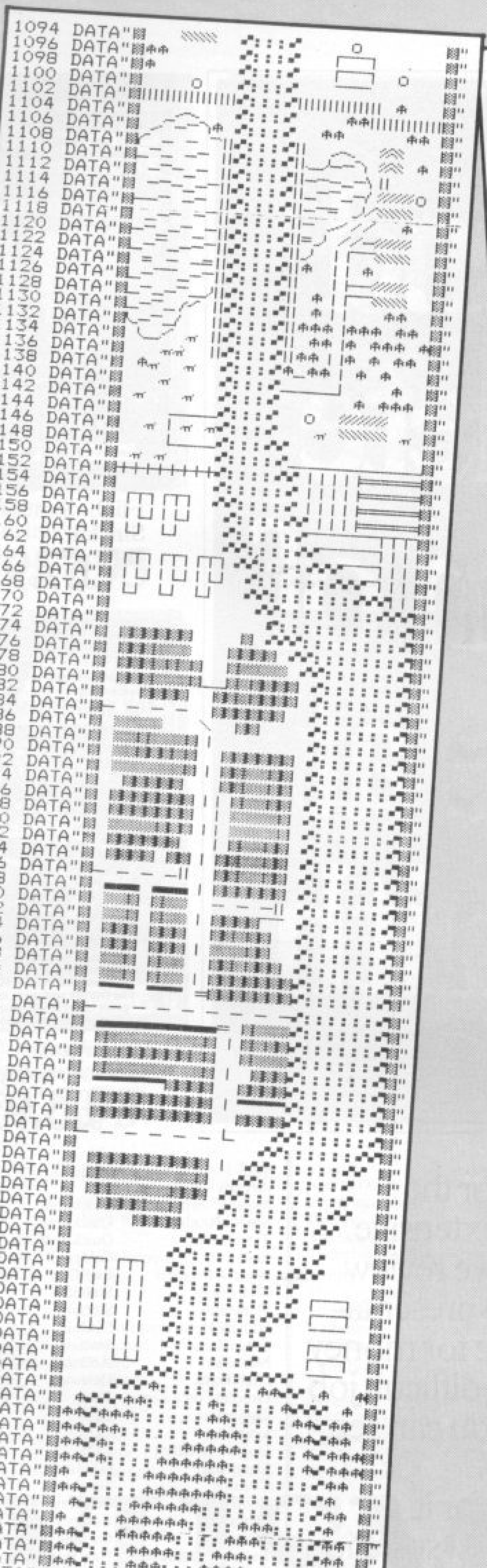
Photographs courtesy Warner Bros.

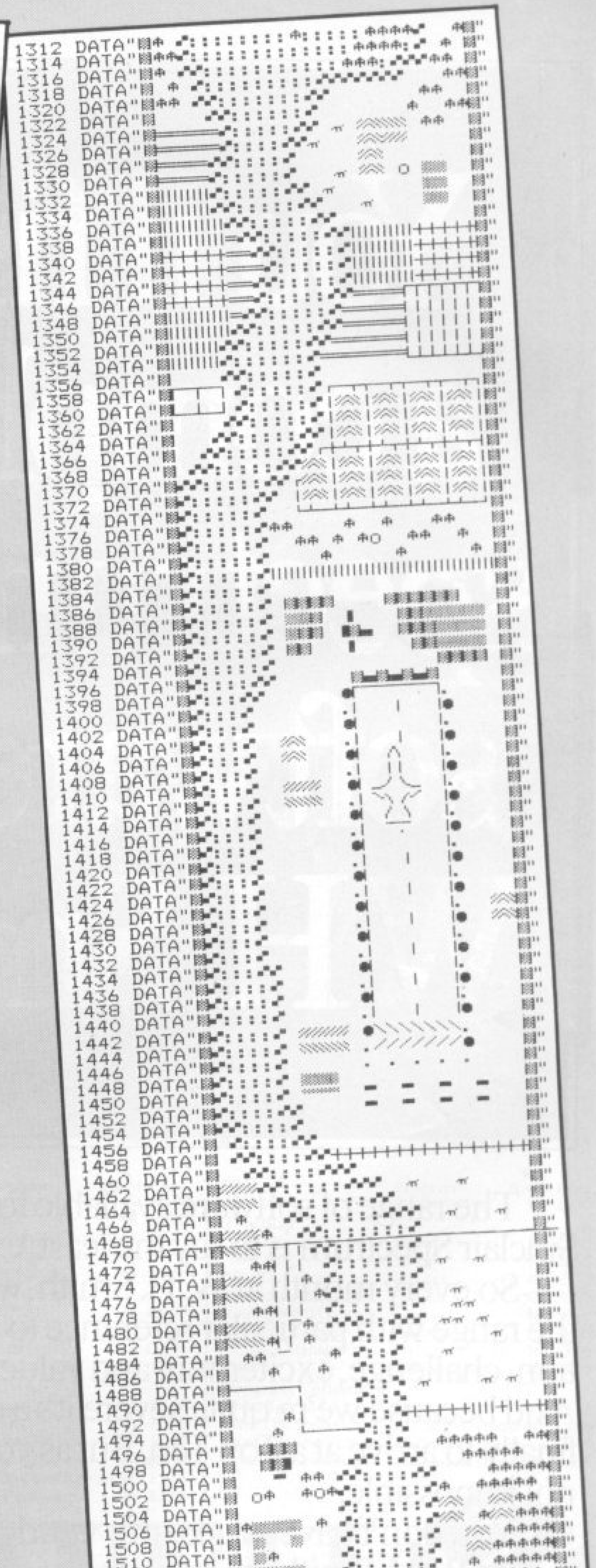
```
1 REM        * MAD MAX
2 REM        *
3 REM        * Copyright 1982
4 REM        * BASIL ZIMMO
5 REM
9 GOSUB800
10 DIMR$(255),P$(7):FORI=0TO255:READR$(I):NEXT:FORI=1TO7:READP$(I):NEXT
20 DIMHS(20),HS$(20):PL=0:PRINT"▣+ + + + + + + + MAD MAX + + + + + + + +"
21 PRINT:PRINT:GOSUB801
22 PRINT"▣CONTROLS":PRINT"▣           W":PRINT"        ↑":PRINT"     A←";CHR$(98);"→D"
23 PRINT"       ↓":PRINT"       X"
25 INPUT"▣▣▣ENTER NUMBER OF PLAYERS ?";N
30 IFN<1THENUSR(62):GOTO25
40 NU=0:PL=PL+1:IFPL>NTHEN 510
45 PRINT"▣PLAYER";PL;" TO MAKE A RUN":FORI=1TO2000:NEXT
50 X=53828:R=24:PRINT"▣";:M=201:XS=1:SC=0
60 FORI=0TO23:PRINTTAB(8);R$(I):NEXT
65 FORI=1TO500:NEXT:POKEX,M
100 POKE4514,240:USR(68):POKE17828,0:GETA$:IFA$=""THEN300
110 IFA$="A"THENA=-1:GOTO150
120 IFA$="D"THENA=1:GOTO150
130 IF(A$="X")*(X<54128)THENA=40:XS=XS+1:GOTO150
135 IF(A$="W")*(X>53847)THENA=-40:XS=XS-1:GOTO150
140 GOTO300
150 POKE4514,250:USR(68):IF(PEEK(X+A)=46)*(PT=1)THEN700
151 IFPEEK(X+A)=46THEN170
155 IFPEEK(X+A)<>79THEN403
170 POKEX,79:X=X+A:POKEX,M
300 R$=R$(R):IFUNTHENR$=P$(UN)
305 RD=INT(RND(1)*26+1):IFRD>13THENUSR(71)
310 IFMID$(R$,RD,1)=":"THEN320
315 GOTO330
320 R$=LEFT$(R$,RD-1)+CHR$(97)+MID$(R$,RD+1,27)
330 PRINTTAB(8);R$:IFPEEK(X)<>79THEN400
335 POKEX-40,79:POKEX,M:R=R+1
336 IFUNTHENUN=UN+1:IFUN=8THENUN=0:R=1:GOTO350
340 IFR>255THENR=1:NU=NU+1:IFNU=2THENNU=0:UN=1:PT=1
350 SC=SC+10*XS:GOTO100
400 IF(PEEK(X)=46)*(PT=0)THEN335
401 IF(PEEK(X)=46)*(PT=1)THEN700
402 IFPEEK(X)=MTHEN335
403 FORJ=1TO3
405 POKE4514,130:USR(68):C=67:GOSUB500
410 POKE4514,160:USR(68):C=71:GOSUB500
420 POKE4514,100:USR(68):C=46:GOSUB500
421 POKE4514,140:USR(68):C=46:GOSUB500
425 NEXTJ
430 POKE4514,90:USR(68):C=0:GOSUB500
440 USR(71):PRINT"▣PLAYER: ";PL
445 PRINT"▣SCORE :";SC:IFHS(20)>=SCTHEN475
450 PRINT"▣YOU HAVE GOT ONE OF THE HIGH SCORES"
455 INPUT"▣ENTER YOUR NAME :";N$
456 N$=LEFT$(N$,6)
460 FORI=1TO20:IFHS(I)>SCTHEN 490
470 FORJ=19TOISTEP-1:HS(J+1)=HS(J):HS$(J+1)=HS$(J):NEXT:HS(I)=SC:HS$(I)=N$
475 PRINT"▣HIGH SCORES▣":FORI=1TO10
480 PRINTI;")";TAB(4);HS(I);TAB(12);HS$(I);TAB(20);I+10;")";TAB(25);
485 PRINTHS(I+10);TAB(33);HS$(I+10)
490 NEXTI:USR(62)
492 HS=HS(1):D$=HS$(1)
494 PRINT"▣Press any key when ready"
495 GETA$:IFA$=""THEN495
496 GOTO40
500 POKEX,C:POKEX-1,C:POKEX+1,C:POKEX-40,C:POKEX+40,C
505 FORI=1TO100:NEXT:RETURN
510 PRINT"▣GAME OVER"
515 PRINT"▣HIGH SCORE";HS;". HELD BY ";N$
520 PRINT"▣▣PRESS 'P' TO PLAY AGAIN"
530 GETA$:IFA$=""THEN530
540 IFA$="P"THEN20
550 END
700 POKEX,79:X=X+A:POKEX,M
705 PRINT"▣YOU MADE":PRINT"▣IT TO":PRINT"▣THE"
710 PRINT"▣PETROL":PRINT"▣STATION":PRINT"▣▣5000":PRINT"▣POINTS"
720 FORI=1TO4000:NEXT:SC=SC+5000:PT=0:POKE4466,24:GOTO300
```








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1506 DATA"
1508 DATA"
1510 DATA"
1512 DATA"
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1520 DATA"
1522 DATA" PETROL
1524 DATA"
1526 DATA"
1528 DATA"
1530 DATA"

# You'll find a complete spectrum of software at W. H. Smith.




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48K £7.95




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Melbourne House
48K £6.95

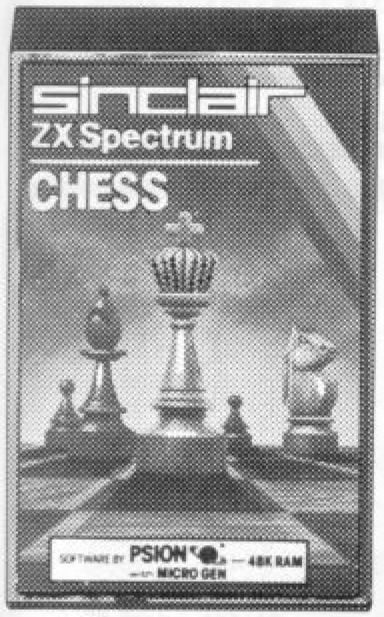
The range of software available for the Sinclair Spectrum is to say the least, extensive.

So every month at W. H. Smith, we review the range with particular reference to presentation, challenge, excitement and value for money. And because we're quite severe it's a difficult job finally to arrive at a Top Ten. But as you can see, not impossible.

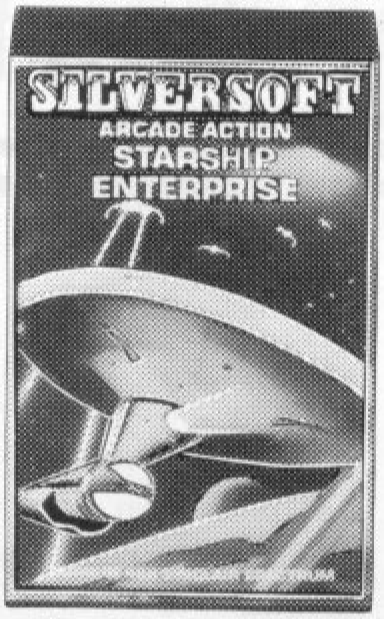
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| Leapfrog | CDS | 16 | £5.95 |
| Gobble-A-Ghost | CDS | 16 | £5.95 |
| Centi-Bug | DK Tronics | 16 | £4.95 |
| Cruising | Sunshine | 16 | £4.95 |
| Blind Alley | Sunshine | 16 | £4.95 |
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| Jackpot | Computer Rentals | 48 | £4.95 |
| Escape | New Generation | 16 | £4.95 |
| Gobbleman | Artic | 16 | £4.95 |
| Galaxians | Artic | 16 | £4.95 |
| Invasion Force | Artic | 16 | £4.95 |
| Sentinal | Abacus | 16 | £4.95 |
| Cyber Rats | Silversoft | 16 | £5.95 |



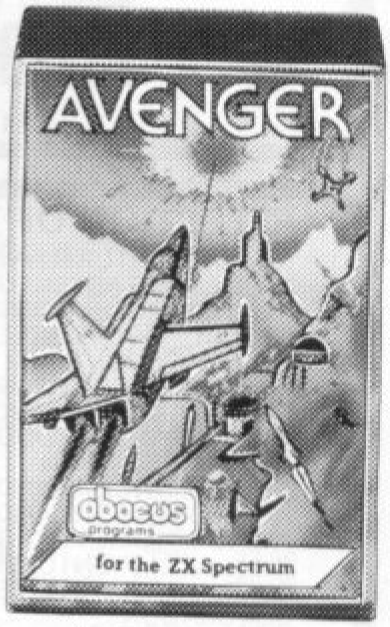

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|---|---|---|---|
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| Voice Chess | Artic | 48 | £9.95 |
| Superchess II | C P Software | 48 | £7.95 |
| Football Manager | Addictive | 48 | £6.95 |
| Chess – The Turk | Oxford | 48 | £8.95 |
| Dictator | DK Tronics | 48 | £4.95 |
| **Adventure** | | | |
| Labyrinth | Axis | 16 | £5.95 |
| Planet of Death | Sinclair | 16 | £6.95 |
| Inca Curse | Sinclair | 48 | £6.95 |
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| Title | Producer | K RAM | Price |
|---|---|---|---|
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| Espionage Island | Artic | 48 | £6.95 |
| Rescue | Computer Rentals | 48 | £5.95 |
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| Test Match | Computer Rentals | 48 | £5.95 |
| Backgammon | C P Software | 48 | £5.95 |

| Title | Producer | K RAM | Price |
|---|---|---|---|
| Draughts | C P Software | 48 | £6.95 |
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# WHSMITH

Prices correct at time of going to press. Subject to availability. At selected branches only.

Wriggle your way out of this one if you can! You are a worm with a taste for bluebottles. The only trouble is these tasty morsels inhabit a mushroom maze — and these mushrooms are simply not to your taste — in fact they are positively lethal!

The object of the game is to guide your wriggling worm around the mushroom maze, gobbling up the bluebottles. Each time you munch one of flies your worm grows — the more you eat the longer the worm gets — making it increasingly difficult to control. If you hit a deadly mushroom or run into your own tail you loose one of your three lives.

The program uses redefined characters which it pokes directly into screen RAM. It also uses display list interrupts to give a striped effect to the background.

When RUN the screen will display end of game, you then press the button on your joystick and enter the skill level required — from 0-10.

**RUNS ON AN ATARI 400/800 IN 16K WITH JOYSTICK**

**BY PAUL MARGRAVE**



Illustration: Terry Rogers



```
4 ? "[illegible]"
5 POSITION 14,4:? "GROW-WORM":POSITION 12,6:? "BY P.MARGRAVE"
10 POSITION 13,10:? "PLEASE WAIT":GOSUB 620:GOSUB 760:GRAPHICS 1+16
20 POKE 559,0:POKE 712,196:POKE 709,191:POKE 710,30:POKE 708,58:POKE 711,142:LI=
3:BO=248:GOSUB 790:GOTO 510
30 ? #6;"}":POKE 712,196:POKE 709,191:POKE 710,30:POKE 708,58:POKE 711,142
40 POKE 756,CHSET/256
50 D=PEEK(88)+256*PEEK(89)
60 FOR A=1 TO 4:POKE D+A,3:NEXT A:POKE D+A,135:HD=D+A:TL=D+1:DR=3:IN=D+60+INT(RN
D(0)*340):POKE IN,BO
70 GOSUB 590
80 SOUND 1,200,12,8:SOUND 0,0,0,0:JS=STICK(0):IF JS=15 THEN 120
90 DR1=DR+((DR=3)*2)+((DR=4)*2)-((DR=5)*2)-((DR=6)*2)
100 DR=6-(JS=11 OR JS=10)-((JS=13 OR JS=9)*2)-((JS=7 OR JS=5)*3)
110 IF DR=DR1 THEN DR=DR1+((DR1=3)*2)+((DR1=4)*2)-((DR1=5)*2)-((DR1=6)*2)
120 HD1=HD+(DR=3)-(DR=5)+((DR=4)*20)-((DR=6)*20)
130 IF HD1<D THEN HD1=HD1+459
140 IF HD1>D+459 THEN HD1=HD1-459
150 IF PEEK(HD1)<>0 THEN GOSUB 300
160 POKE HD,DR:POKE HD1,135:HD=HD1:SOUND 1,0,0,0
170 IF GR>0 THEN GR=GR-1:SC=SC+LL:GOTO 210
180 TD=PEEK(TL):POKE TL,0:TL=TL+(TD=3)-(TD=5)+((TD=4)*20)-((TD=6)*20)
190 IF TL<D THEN TL=TL+459
200 IF TL>D+459 THEN TL=TL-459
210 SOUND 0,20+ID,12,6
220 GOSUB 230:GOTO 80
230 ID=INT(RND(0)*4):IF ID=AD THEN 230
240 AD=ID
250 IN1=IN+(ID=0)-(ID=1)+((ID=2)*20)-((ID=3)*20)
260 IF IN1<D THEN IN1=IN1+459
270 IF IN1>D+459 THEN IN1=IN1-459
280 IF PEEK(IN1)<>0 THEN RETURN
290 POKE IN,0:POKE IN1,BO:IN=IN1:POSITION 1,23:? #6;"score:";SC;" level:";LV:RET
URN
300 SOUND 0,0,0,0:SOUND 1,0,0,0:IF PEEK(HD1)=248 THEN 320
310 GOTO 350
320 POKE IN,0:GR=GR+1+INT(RND(0)*LL)
330 IN=D+60+INT(RND(0)*340):IF PEEK(IN)<>0 THEN 330
340 FOR DE=1 TO 10:SOUND 0,DE,12,8:NEXT DE:FOR DE=1 TO 10:NEXT DE:SOUND 0,0,0,0:
RETURN
350 TD=PEEK(TL):IF TD=135 THEN 370
360 POKE TL,TD+128:FOR DE=1 TO 20:SOUND 0,50+DE*2,10,9:NEXT DE:POKE TL,0:SOUND 0
,0,0,0:SC=SC+5
370 POKE IN,0:POSITION 1,23:? #6;"score:";SC;" level:";LV:TL=TL+(TD=3)-(TD=5)+((
TD=4)*20)-((TD=6)*20)
```

# GROW WORM

```
380 IF TL<D THEN TL=TL+459
390 IF TL>D+459 THEN TL=TL-459
400 IF TD<>135 THEN 350
410 HD1=HD-20:POKE HD,135:FOR DE=1 TO 10:SOUND 0,20+DE,12,8:NEXT DE:FOR DE=1 TO
10:NEXT DE
420 POKE HD,0:SOUND 0,0,0,0:IF HD1<D THEN 440
430 HD=HD1:GOTO 410
440 IF LI=1 THEN 510
450 LI=LI-1:POSITION 2,0:? #6;LI;" li";:IF LI>1 THEN ? #6;"ves";:GOTO 470
460 ? #6;"fe";
470 ? #6;" left."
480 IF STRIG(0)=1 THEN 480
490 POSITION 0,0:? #6;"                    "
500 GR=0:GOTO 30
510 POKE 756,CHSET/256:POSITION 2,0:? #6;"END OF GAME.":IF SC>HSC THEN HSC=SC
520 D=PEEK(88)+256*PEEK(89):POSITION 2,10:? #6;"high score:";HSC
530 IN=D+60+INT(RND(0)*340)
540 POKE 77,0:IF STRIG(0)=1 THEN GOSUB 230:GOTO 540
550 SC=0:LI=3:POSITION 2,0:? #6;"which level.   "
560 OPEN #1,4,0,"K:":GET #1,A:CLOSE #1
570 A=A-48:IF A<0 OR A>9 THEN 560
580 LL=1+A+((A>0)*8):GR=0:LV=A:GOTO 30
590 FOR C=1 TO LL:X=INT(RND(0)*18)+1:Y=INT(RND(0)*18)+1
600 X=INT(RND(0)*16)+2:Y=INT(RND(0)*19)+2:LOCATE X,Y,PO:IF PO<>32 THEN 600
610 POSITION X,Y:? #6;"z":NEXT C:RETURN
620 DIM C$(20)
630 C$="#$%&'ZX"
640 CHSET=(PEEK(106)-8)*256:CHORG=57344
650 FOR I=0 TO 511:POKE CHSET+I,PEEK(CHORG+I):NEXT I
660 FOR I=1 TO LEN(C$):CHPOS=CHSET+(ASC(C$(I))-32)*8
670 FOR J=0 TO 7:READ A:POKE CHPOS+J,A:NEXT J:NEXT I
680 RETURN
690 DATA 60,126,255,255,255,255,126,60,60,126,255,255,255,255,126,60,60,126,255,
255,255,255,126,60
700 DATA 60,126,255,255,255,255,126,60,60,126,219,153,255,231,66,36,24,60,255,12
6,24,24,24,0
710 DATA 60,153,126,60,126,189,36,66
760 DATA 72,138,72,238,80,6,174,80,6,189,31,6,141,10,212,141,26,208,224,24,208,5
,169,0,141,80,6,104,170,104,64
770 DATA 196,196,196,194,194,194,196,196,196,194,194,194,196,196,196,194,194,194
,196,196,196,194,194,34,194
780 FOR A=1 TO 56:READ B:POKE 1535+A,B:NEXT A:RETURN
790 D=PEEK(560)+256*PEEK(561)
800 POKE D+3,198:FOR A=1 TO 23:POKE D+5+A,134:NEXT A
810 POKE 512,0:POKE 513,6:POKE 1616,0:POKE 54286,192:POKE 559,34
820 RETURN
```

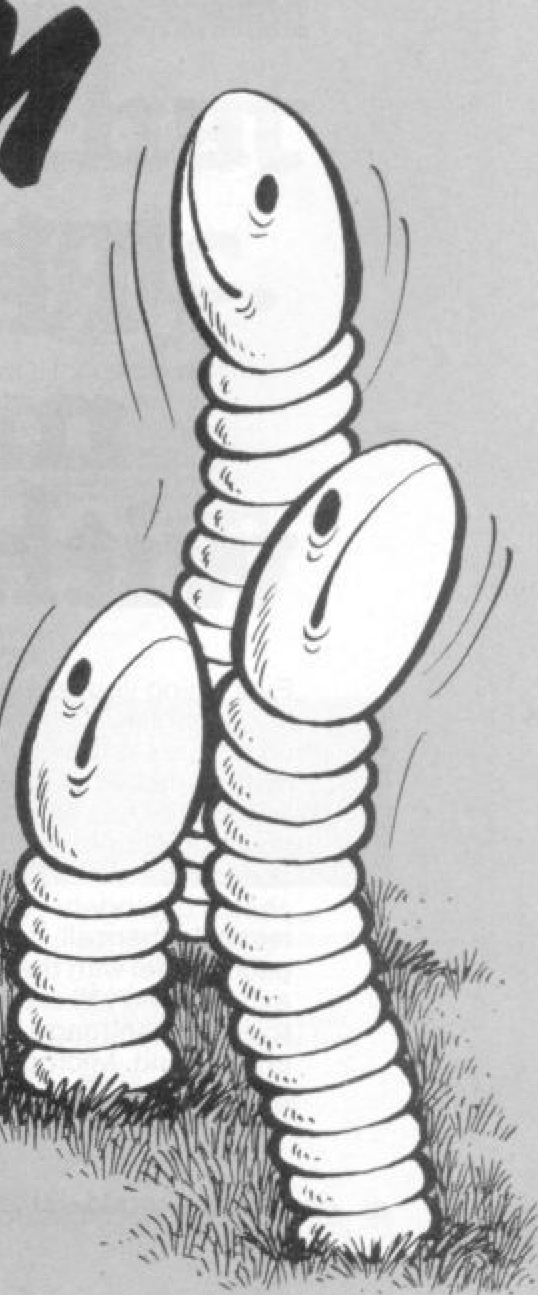


Illustration: Terry Rogers

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```
   1 IF PEEK 23731=123 THEN GO T
O 20
   2 CLEAR 31574: FOR a=0 TO 256
*3-1
   3 POKE a+31831,PEEK (a+15616)
   4 NEXT a
   5 LET a=31831-256
   6 LET b=INT (a/256)
   7 LET c=a-b*256
   8 POKE 23606,c: POKE 23607,b
  10 LET a$="!@#%&_£?↑."
  11 REM FOR a=1 TO LEN a$: FOR
b=0 TO 7: READ c: POKE 31831+8*(
CODE a$(a)-32)+b,c: NEXT b: NEXT
 a
  12 DATA BIN 11110000,BIN 11111
000,BIN 1111110,BIN 11100000,BI
N 1111100,BIN 11110000,BIN 1111
1110,BIN 11111000
  13 DATA BIN 111,BIN 11111,BIN
11,BIN 1111111,BIN 1111,BIN 1111
11,BIN 1,BIN 1111
  14 DATA 0,BIN 111100,BIN 11111
10,BIN 11011011,BIN 1111110,BIN
111100,BIN 1011010,BIN 10000001
  15 DATA BIN 11000,BIN 11000,BI
N 111100,BIN 111100,BIN 1111110,
255,255,BIN 100100
  16 DATA BIN 11100,BIN 100010,B
IN 1011101,BIN 1010001,BIN 10110
01,BIN 1010001,BIN 111110,BIN 10
00001
  17 DATA 16,BIN 111000,BIN 1111
1100,255,BIN 1111110,BIN 11100,B
IN 1100,0
  18 DATA BIN 110000,BIN 1111100
,BIN 111110,BIN 1111111,BIN 1111
1110,BIN 1111000,BIN 111000,0
  19 DATA BIN 11000,BIN 100100,B
IN 1000010,255,BIN 1000010,BIN 1
11100,BIN 1000010,BIN 1000010
  20 DATA 255,255,255,254,255,25
5,255,255
  21 DATA 255,255,255,255,254,25
5,255,255
  29 REM START OF PROGRAM
  30 LET di=0: LET sp=15: LET fu
=30: LET sc=0: LET cp=10: LET cw
=10
  35 LET rl=100: LET sy=0
  40 LET a$="↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
↑↑↑↑↑↑↑↑↑↑↑↑↑↑"
  50 LET b$="
           "
  54 LET y$="3320004004330000000
00000000000000000000000000000000
0000000000000"
  55 LET x$="%%&_££?££?%%

           "
  56 PAPER 6: BORDER 6: CLS
  57 INPUT "Press enter to start
"; LINE q$
  60 REM LOOP LINE
  70 POKE 23692,255: PRINT AT 21
,0; PAPER 0;a$( TO cp-1); PAPER
6;"!";b$( TO cw);"@"; PAPER 0;a$
(cp+cw+2 TO );
  71 LET v=1+RND*63: PRINT AT 21
,RND*(cw-2)+cp; INK VAL y$(v);x$
(v)
  75 LET di=di+1: IF di>300 THEN
 PRINT AT 21,0; PAPER 0; INK 0;"
................................
";: GO TO 9000
  80 LET c$=SCREEN$ (0,sp)
  90 IF c$<>" " THEN GO TO 1000
 100 PRINT AT 0,sp; INK 1;"#"
 110 LET sm=(IN 61438=254)-(IN 6
3486=254)
 111 IF fu>0 THEN LET sp=sp+sm
 112 LET fu=fu-(sm<>0)
 113 IF fu=11 THEN GO SUB 8000
 114 IF fu=0 THEN GO SUB 8040
 120 LET cw=cw+INT (RND*3)-1
 130 IF cw>9 THEN LET cw=9
 140 IF cw<3 THEN LET cw=3
 150 LET cp=cp+INT (RND*3)-1
 160 IF cp+cw>26 THEN LET cp=26-
cw
 170 IF cp<2 THEN LET cp=2
 180 GO TO 60
1000 REM HIT SOMETHING
1001 IF c$="." THEN GO TO 3000
1005 IF c$="&" AND fu<100 THEN L
ET fu=fu+25: PRINT AT 10,27;fu:
BEEP .5,20: GO TO rl
1006 IF c$="&" THEN BEEP .1,5: B
EEP .1,0: BEEP .1,-5: LET fu=INT
 (fu-RND*fu): PRINT AT 8,27; FLA
SH 1; BRIGHT 1;"TOO";AT 9,27;"MU
CH";AT 10,27;fu: GO TO rl
1010 PRINT AT sy,sp; FLASH 1; BR
IGHT 1;"#"
1020 BEEP 1,48
1030 PRINT AT sy,sp;c$
1040 RESTORE 1050
1045 PAUSE 60: CLS
1046 GO SUB 1200
1050 DATA 1,0,1,2,.5,3,.5,2,1,0
1051 DATA 1,0,1,2,.5,3,.5,2,1,0
1052 DATA 1,3,1,5,2,7
1053 DATA 1,3,1,5,2,7
1054 DATA .75,7,.25,8,.5,7,.5,5,
.5,3,.5,2,1,0
1055 DATA .75,7,.25,8,.5,7,.5,5,
.5,3,.5,2,1,0
1056 DATA 1,0,1,-5,2,0
1057 DATA 1,0,1,-5,2,0
1058 REM GO TO 1080: REM OPTION
TO CUT OUT MUSIC
1060 FOR a=1 TO 36
1070 READ b,c: BEEP b/2,c: NEXT
a
1080 FOR a=8 TO 23: PLOT 120,a:
DRAW FLASH 0; OVER 1;23,0: NEXT
a
1090 PRINT AT 0,0;"You crashed a
fter ";di;" Kilometers"'"and wit
h ";fu;"000 Litres of fuel"
1100 INPUT "Want another go (y/█
)";a$
1110 IF a$="y" THEN RUN
1120 IF a$<>"n" THEN GO TO 1100
1130 CLS : LET a$="Goodbye*****"
1140 FOR a=1 TO LEN a$: BEEP .1,
22-2*a: PRINT AT a,a;a$(a): NEXT
 a
1199 STOP
1200 PRINT AT 21,0;"█████████████████
███████████████";
1210 PRINT AT 20,0;"█████████████████
███     ████████████";
1220 PRINT AT 19,0;"█████████████████
███     ████████████";
1230 FOR a=1 TO 20: BEEP .03,a*2
: PRINT AT a,16;"#";AT a-1,16;"
": NEXT a
1240 PRINT AT 20,16; FLASH 1; BR
IGHT 1;"#"
1250 PLOT 100,24: DRAW 0,30: DRA
W -10,0: DRAW 0,10: DRAW 10,0: D
RAW 0,10: DRAW 10,0: DRAW 0,-10:
 DRAW 10,0: DRAW 0,-10: DRAW -10
,0: DRAW 0,-30
1260 RETURN
3000 REM REACHED THE END
3010 PRINT AT sy,sp; BRIGHT 1;"#
"
3020 BEEP 1,20
3030 CLS
3040 PRINT AT 21,0;"█████████████████
███████████████"
3050 FOR a=1 TO 20: PRINT AT a-1
,16;" ";AT a,16;"#": PAUSE a/2:
NEXT a
3060 PRINT AT 0,0; BRIGHT 1;"YOU
 MADE IT TO THE END"
3070 PRINT '"You had "; BRIGHT 1
;fu;"000"; BRIGHT 0;" litres of
fuel"'"left when you landed"
3080 GO TO 1100
8000 REM LOW FUEL
8010 FOR a=1 TO 4: BEEP .08,0: B
EEP .08,20: NEXT a
8020 PRINT AT 10,27; FLASH 1; BR
IGHT 1; PAPER 2; INK 7;"LOW";AT
11,27;"FUEL"
8025 LET fu=fu-1
8030 RETURN
8040 BEEP 1,-30
8050 PRINT AT 10,27; FLASH 1; BR
IGHT 1; PAPER 2; INK 7;"NO";AT 1
1,27;"FUEL"
8055 LET fu=-1
8060 RETURN
9000 REM END OF GAME
9010 LET rl=9060: PRINT AT 0,sp;
" ": LET sy=1: LET sm=0
9020 PRINT AT sy,sp-sm;" "
9025 LET sy=sy+1
9030 LET c$=SCREEN$ (sy,sp)
9040 PRINT AT sy,sp; INK 1;"#"
9045 FOR a=1 TO 20: NEXT a
9050 IF c$<>" " THEN GO TO 1000
9060 LET sm=(IN 61438=254)-(IN 6
3486=254)
9070 IF fu>0 THEN LET sp=sp+sm
9080 LET fu=fu-(sm<>0)
9090 GO TO 9020
```

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Journey to the centre of a lost planet on the far reaches of our galaxy in search of . . . whatever you find there!

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**BY M. WISEMAN**



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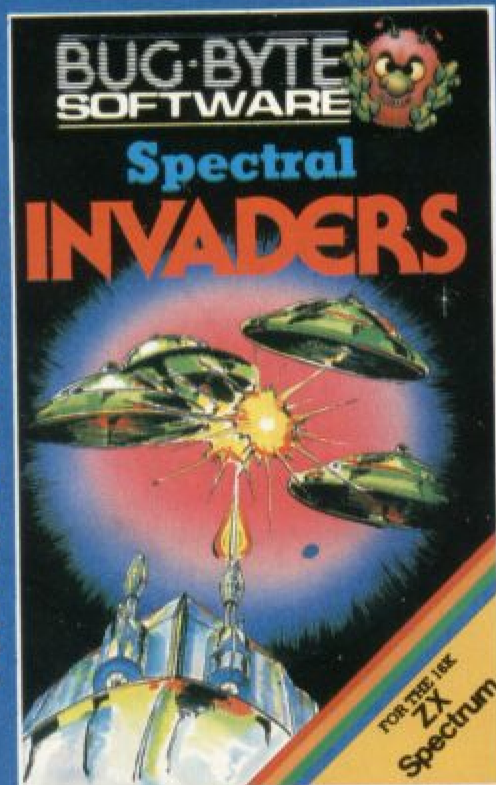
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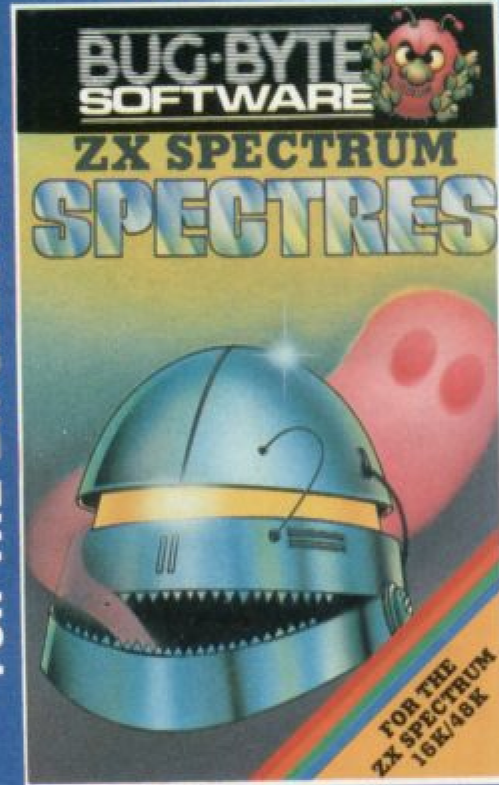



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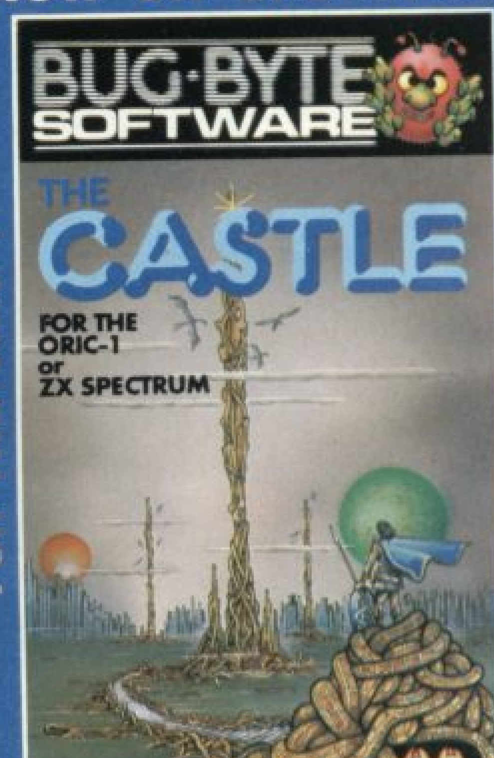



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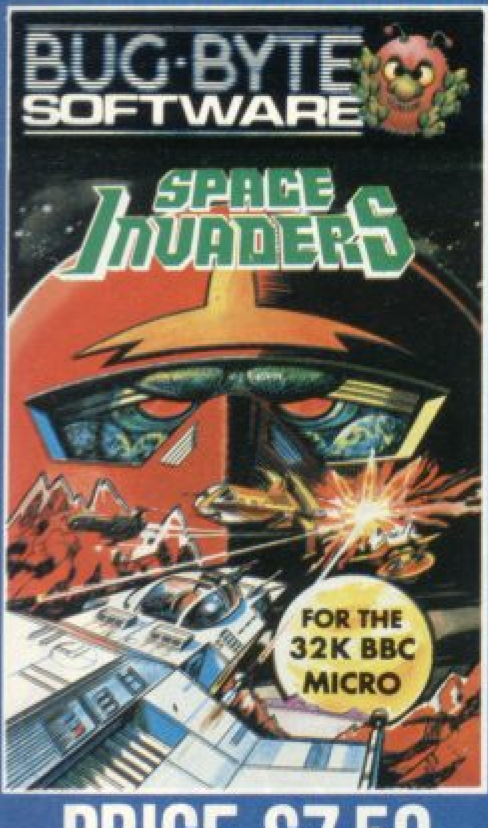
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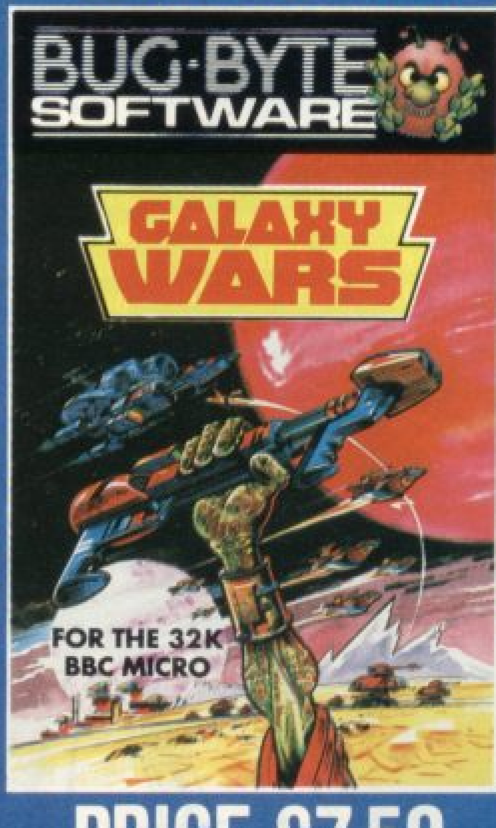



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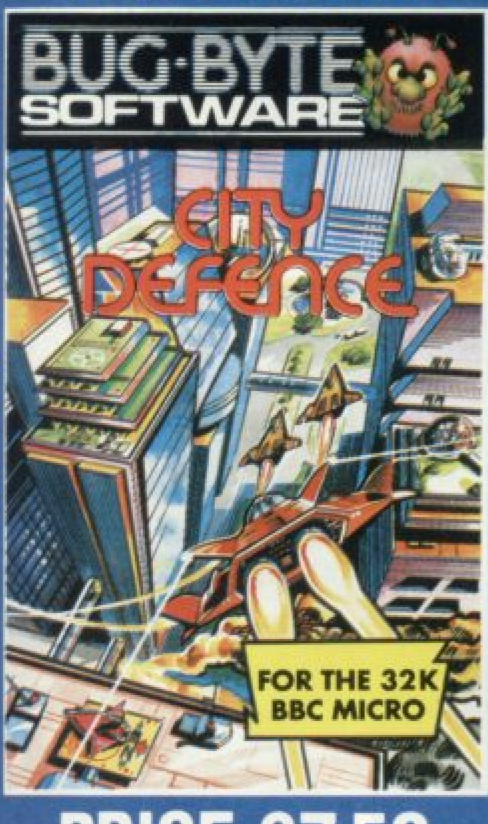



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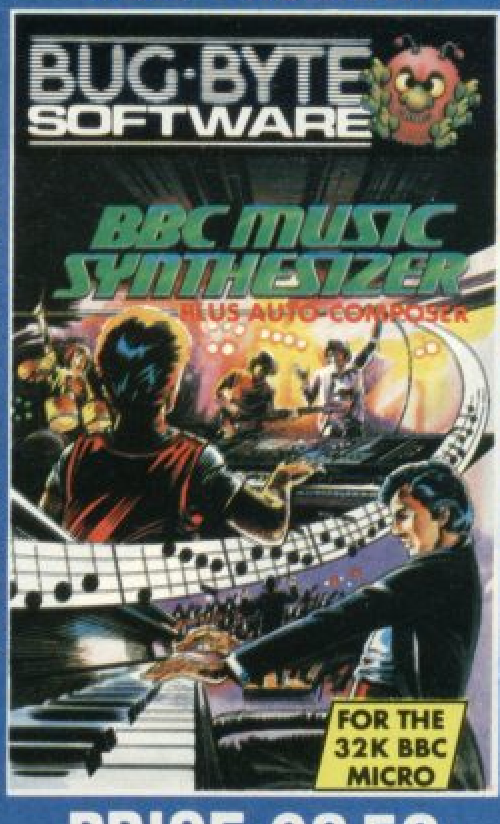



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# GHOSTS REVENGE

Ghosts of the world unite! You have nothing to lose but your Pacman! We've put up with that horrible little creature for long enough. It's time we fought back — and I've got a plan to beat him. All we have to do is get rid of those sneaky little power pills in the corners of our maze that will fix the little blighter. OK lads, let's get to it!

This just had to happen. A poor little Pacman trapped in the maze with a ravenous ghost chasing him — and not a power pill in sight! This is a joystick controlled game for two players. One takes the part of the poor little Pacman, the other becomes the hungry ghost out for a quick snack.

## RUNS ON A DRAGON IN 32K

## BY GARETH JONES

The Pacman is represented by the red square, which moves around the maze gobbling up dots for points. Meanwhile the ghost chases after him — represented by a black square. The difficulty of the game depends on the skill of your opponent!

The Main variable are:

A: The position of the black square

B: The position of the red square

S: Score

U: Last score

M$: A blue square that makes up the maze walls

T$: A white square that makes up the maze passages

I have poked the moving graphics on the screen instead of using print @. The addresses are in the range of 1024 to 1535



```
60 U=0
70 M$=CHR$(175)
80 T$=CHR$(207)
90 CLS
110 PRINT"  ==================
120 PRINT:PRINT"THE LEFT JOYSTICK CONTROLS THE  RED SQUARE AND THE RIGHT
JOYSTICK CONTROLS THE BLACK      SQUARE.THE AIM OF THE GAME FOR  THE BLACK SQUARE
 IS TO CATCH THERED SQUARE,AND THE RED SQUARE   GAINS A POINT EVERY TIME IT
MOVES"
130 PRINT:PRINT
140 PRINT"PRESS A JOYSTICK BUTTON"
150 P=PEEK(65280):IF P=125 OR P=253 OR P=126 OR P=254 THEN 170
160 GOTO 150
170 PLAY"T100CDEFGABCDEFGABCDEFGABCDEFGAB"
180 CLS
190 A=1328
200 B=1200
210 '
220 REM     PRINT MAZE
230 '
240 PRINTSTRING$(32,M$);
250 PRINTM$T$T$T$T$M$T$T$T$T$T$M$M$M$M$M$M$T$T$T$T$T$T$M$T$T$T$T$M$;
260 PRINT M$T$M$M$M$T$M$T$M$M$M$M$T$M$M$M$M$M$M$M$T$M$M$M$M$T$M$T$M$M$M$T$M$;
270 PRINT M$;:PRINTSTRING$(12,T$);M$M$M$M$M$M$M$M$M$; :PRINT STRING$(12,T$);M$;
280 PRINTM$T$M$M$M$T$M$T$M$M$M$M$M$T$M$M$M$M$M$M$M$T$M$T$M$M$M$M$T$M$;
290 PRINTM$ STRING$(30,T$) M$;
300 PRINTM$M$M$M$M$T$M$T$;STRING$(16,M$)T$M$T$M$M$M$M$M$;
310 PRINTT$T$T$T$T$T$M$T$T$T$T$T$T$M$M$M$M$T$T$T$T$T$T$M$T$T$T$T$T$T$;
320 PRINTM$M$M$M$M$M$T$M$M$M$M$M$M$M$M$T$M$M$M$M$M$M$M$M$T$M$M$M$M$M$M$;
330 PRINTM$;STRING$(30,T$);M$;
340 PRINTM$T$M$M$M$M$T$M$T$M$M$M$M$T$M$M$M$M$M$M$M$T$M$T$M$M$M$M$T$M$;
350 PRINTM$;STRING$(12,T$);M$M$M$M$M$M$M$;STRING$(12,T$);M$;
360 PRINTM$T$M$M$M$M$T$M$T$M$M$M$M$T$M$M$M$M$M$M$M$T$T$T$T$T$M$T$T$T$T$M$;
370 PRINTM$T$T$T$T$T$M$T$T$T$T$T$T$M$M$M$M$M$M$M$;
380 PRINTSTRING$(32,175);
```

```
390 '
400 REM CHECK IF RED SQUARE IS CAUGHT
410 '
420 IF PEEK(A)=191 THEN 700
430 IF PEEK(B)=128 THEN 700
440 '
450 REM READ JOYSTICKS AND UPDATE DISPLAY
460 '
```

```
470 IF JOYSTK(0)=0 AND PEEK(A-1)<>175 THEN A=A-1:POKE A+1,207:PLAY"O4L255C"
480 IF JOYSTK(0)=63 AND PEEK(A+1)<>175 THEN A=A+1:POKE A-1,207:PLAY"O4L255C"
490 IF JOYSTK(1)=0 AND PEEK(A-32)<>175 THEN A=A-32:POKE A+32,207:PLAY"O4L255C"
500 IF JOYSTK(1)=63 AND PEEK(A+32)<>175 THEN A=A+32:POKE A-32,207:PLAY"O4L255C"
510 IF A=1279 AND JOYSTK(0)=63 THEN A=A-31:POKE 1279,207:PLAY"O4L255C"
520 IF A=1248 AND JOYSTK(0)=0 THEN A=A+31:POKE 1248,207:PLAY"O4L255C"
530 IF B=1279 AND JOYSTK(2)=63 THEN B=B-31:POKE 1279,207:PLAY"O5L255C"
540 IF B=1248 AND JOYSTK(2)=0 THEN B=B+31:POKE 1248,207:PLAY"O5L255C"
550 IF PEEK(A)=191 THEN 700
560 IF PEEK(B)=128 THEN 700
570 IF JOYSTK(2)=0 AND PEEK(B-1)<>175 THEN B=B-1:POKE B+1,207:S=S+1:PLAY"O5L255C
"
580 IF JOYSTK(2)=63 AND PEEK(B+1)<>175 THEN B=B+1:POKE B-1,207:S=S+1:PLAY"O5L255C
C"
590 IF JOYSTK(3)=0 AND PEEK(B-32)<>175 THEN B=B-32:POKE B+32,207:S=S+1:PLAY"O5L255
55C"
600 IF JOYSTK(3)=63 AND PEEK(B+32)<>175 THENB=B+32:POKE B-32,207:S=S+1:PLAY"O5L2
```

```
55C"
610 IF PEEK(A)=191 THEN 700
620 IF PEEK(B)=128 THEN 700
630 PRINT@480,"SCORE";S;"  1 UP";U;
640 POKE A,128
650 POKE B,191
660 GOTO 470
670 '
680 REM RED SQUARE CAUGHT
690 '
700 PLAY"T6L3BL8AL3GL8FL3EL8DL1C"
710 U=S
720 CLS:PRINT"THE RED SQUARE'S SCORE=";S;:S=0
730 FOR A=1 TO 1000:NEXT
740 '
750 REM PLAY AGAIN
760 '
770 PRINT:PRINT:PRINT" PRESS A JOYSTICK BUTTON"
780 P=PEEK(65280):IF P=125 OR P=253 OR P=126 OR P=254 THEN 800
790 GOTO 780
800 GOTO 150
1000 GOTO 400
```



Illustration: Dorian Cross

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# ....Introducing the AGF JOYSTICK INTERFACE II for sinclair ZX Spectrum 81

## ABOUT OUR JOYSTICK INTERFACE

Following in the footsteps of our extremely popular original interface, which has sold over 1,000 worldwide since October last year, we have improved its performance.

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The Interface Module II resides in the same memory space as the keyboard, which remains fully functional at all times, therefore it will not interfere with anything else connected.

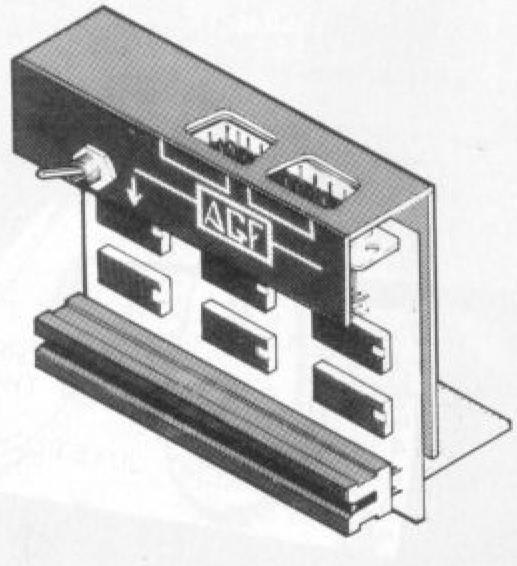
When a suitable joystick is plugged into 'Player 1' socket its action will mimic pressing the cursor keys, up "7", left "5" and so on. The firing button will simulate key ϕ. This unique feature guarantees the best software support.

Take a look at the selection of compatible games we have listed. More are being added all the time as a result of our contact with the various software companies.

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- ★ Free demo program, 'Video Graffiti' + full instructions

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| | | |
|---|---|---|
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| Axis | | Labyrinth |
| Campbell Ststems | | Gulpman |
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| | | Meteroids |
| ICL | | Star Trail (Man.Dock) |
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| Psion | * | Flight Simulation |
| | | VU–3D |
| Silversoft | | Ground Attack |
| | ☐ | Cyber Rats £5.95 |

**ZX81**

| | |
|---|---|
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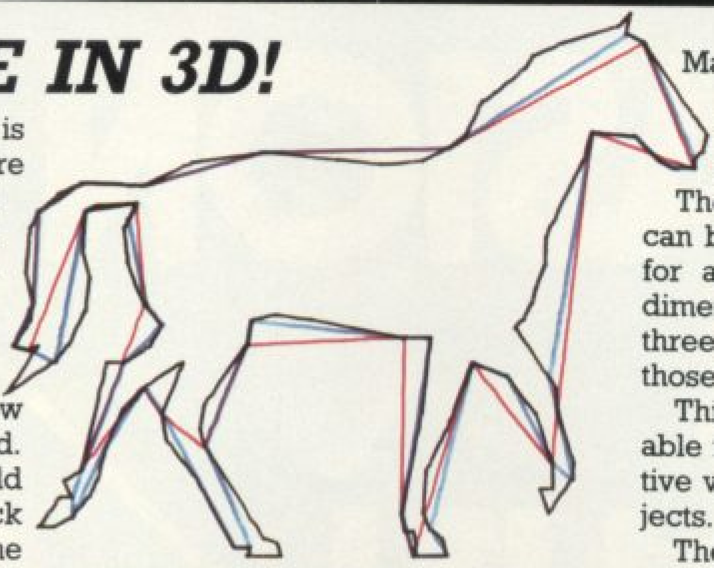
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# GRAPHICS

By Garry Marshall

## *TALK TO ME IN 3D!*



The importance of graphics is being realised in more and more areas. And the need for good graphics utilities which make their creation comparatively simple is being met.

The graphics commands that are included in many microcomputer dialects of Basic do allow any graphics display to be created.

But just as no businessman would be advised to write his own stock control program in Basic, so he would not be advised to write his own graphics programs using the graphics commands available in Basic.

In the same way as general-purpose stock control programs can be purchased, so general-purpose graphics utilities are beginning to become readily available.

Having purchased a commercial package, for whatever purpose, the user has only to learn how to use that package, as opposed to learning all the skills that are needed for programming.

Additional advantages include the provision of good documentation and the support that is provided with professionally produced software.

A prime example of the increasing importance being attached to the provision of graphics utilities is provided by the new Apple LISA.

This machine provides its user with a suite of programs, including a word processor and a database.

The user can use any program in the suite with equal ease, and can swap from one to another at will.

However, what is particularly interesting is that the suite contains not one, but *two* graphics programs.

This detonstrates clearly how important the role of graphics on such a system is considered.

The graphics programs can be used to generate charts and graphs of various kinds using data held by any program in the suite.

Special-purpose graphics languages have been used for a long time with mainframe computers.

They provide systematic ways of generating particular types of graphics that are simple to use.

They also provide some portability for graphics programs, in total contrast to the situation in microcomputer graphics where graphics programs written for one micro will seldom if ever run on another machine.

One graphics package that was originally developed for use on mainframe computers and which is now available for micros is GINO-F. It can be used with the Research Machines' RM380Z. It is, in fact, a library of sub-routines, with each sub-routine providing some graphics capability.

The capabilities that it provides can be grouped broadly into those for administration, those for two-dimensional drawing, those for three-dimensional drawing and those for interaction.

This package is particularly valuable for the production of perspective views of three-dimensional objects.

The three-dimensional drawing commands are natural generalisations of the two-dimensional commands that are familiar to everyone. This makes the programming of perspective views particularly easy, and removes the need for any mathematical knowledge.

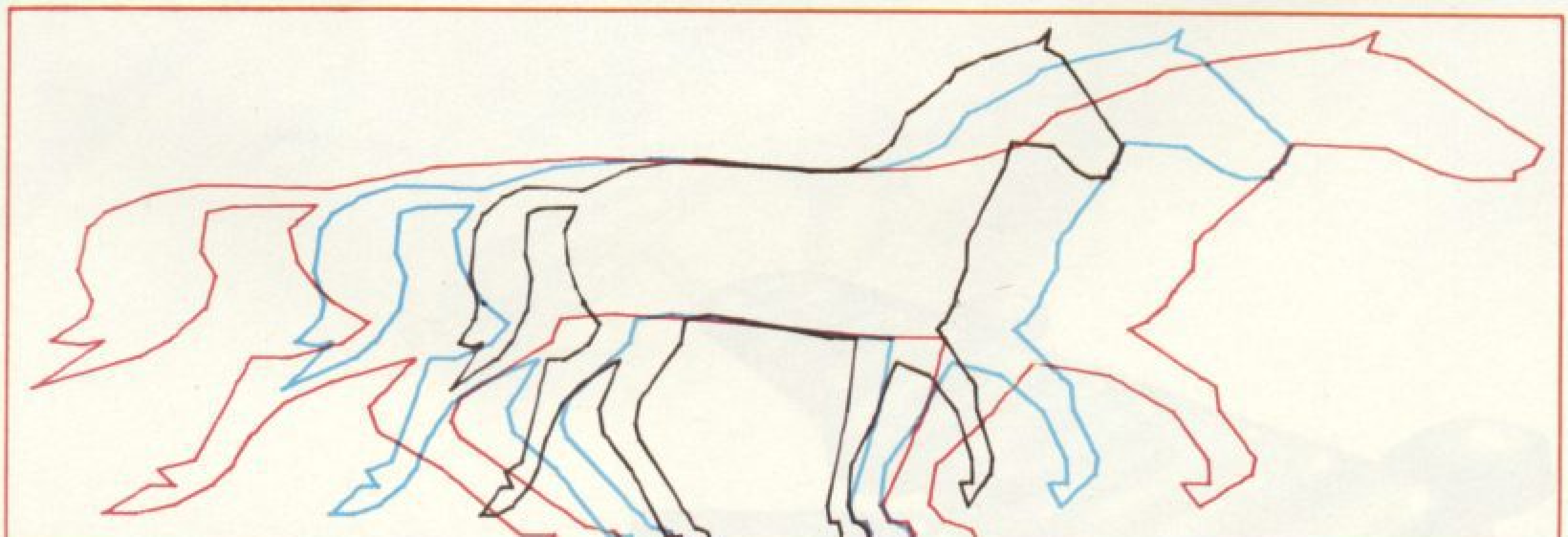
The accompanying illustrations show what can be accomplished with the aid of a suitable package with very short programs.

The package is called PICASO. It is not available for micros, although there is no reason why it should not be.

PICASO was developed by John Vince at Middlesex Polytechnic. It is intended for users with a minimum of programming skill, and was originally intended for use by artists and designers.

It provides a library of shapes and a variety of means for manipulating them.

The illustrations produced by PICASO reproduced here illustrate the point that a good graphics utility can be a remarkably good aid to any kind of graphics programming.




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SCHIZOIDS
Imagine
..the name of the game



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…em up Game
…d. Wave after wave of the most
…deadly aliens
…nically towards your space
…n deadly intent.
…you have dual Plasma Disruptors and
…n Thrust drive haven't you?
ZX SPECTRUM (16K or 48K)
100% machine code with 12 different alien types,
incredible animation and explosive effects, sound and the
fastest, smoothest hi-res graphics ever!
VIC-20 (any memory size)
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smooth hi-res multicolour graphics and animation, narrow
playfield and sensational sound effects.
Keyboard or joystick.
Game design and software by D. H. Lawson.
for any ZX SPECTRUM.
It's my own fault, I even volunteered.
I thought that with the space-dozer and its shovel and skyhook
it would be easy shifting the galaxy's rubbish.
Childs play. HUH! They warned me of the weird packaging,
the trays, the rods, and all the rest.
But they didn't say I'd have to stop and control not just one but two
or even more garbage pods. Then prod them, push
them, toward that black hole, and oh, it's so very, very
black, and so lonely, so empty.
Panic, mustn't panic, but they won't stop, twirling and
spinning and turning, always turning, towards me, against
me, at me. And I'm alone.
No way out, nowhere to hide, on my own, my own… own…
SCHIZOIDS: NOT JUST A GAME, BUT A STATE OF MIND.
SCHIZOIDS features real-time animated 3d graphics for a
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Game design and Software by Peter Paranoid and
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the wildest, zaniest way of earning a
fast buck. With crazy guests screaming for
service you're gonna have to be
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WAITERS


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Barney
bootlace
had never had
it so bad, demoted
from ace detective of
the aristocracy to the
level of a mere store
detective he wanders his
now well worn beat around the
jewellery and watch counters
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CATCHA SNATCHA features smooth Hi-Res multicoloured graphics, sound, multiple playfields and a real time clock. 100% machine code. Keyboard or joystick.
Game design and software by Eugene Evans.
for any Commodore Vic-20.
for any ZX SPECTRUM.
Are you just the average teddy. Are you teddy enough to take on the terrors of the toybox in an epic struggle to fulfill your true role in life – to reach and comfort your crying baby? To boldly go where no teddy has gone before. To overcome incredible odds, to take on and fight the clockwork soldiers, the mammah dolls, the train set, the play people, and the murderous plastercine.
With only the bear essentials – your wellington boot, your beachball and faithful old peashooter – for your defence and your only ally the Jack in the Box, you will need to build stairways from the play bricks around you to reach your baby without getting the stuffing knocked out of you.
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Ah diddums

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**for any VIC-20**
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METHOD: GEO-GRAVITATIONAL MINING.

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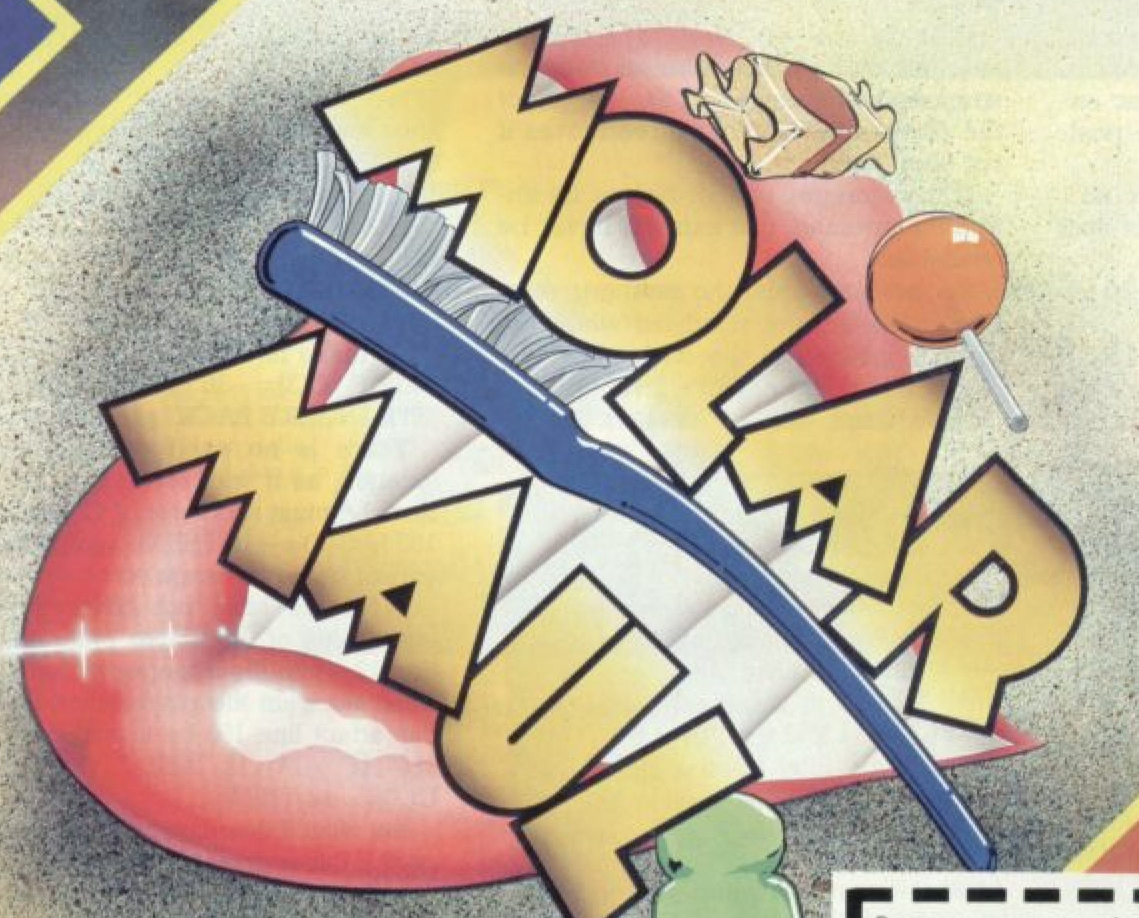
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ONAL
...ny breathtaking
...speed as your plummet
...of the moons of spectrum,
...y the draw of the gravitational field
...ndard anti-grav jet pack to
...e pull.
...e video-gram informed you of your mission, but no
...V message could prepare you for the alien life forms
...ch you are to combat. Only tales exist to describe the
...ormidable band of aliens awaiting you in the depths, tales of
the huge beast and many more which exist only as myths . . .
for the time being?
At hand you have the very latest mining equipment, 2-way
radar indicates approaching aliens from above, below and all
round you, an anti-inhabitant laser and of course your trusty
jet pack.

Frantic the rock asylum that will send you frantic.
This 100% machine code experience presents you with a near infinite number of levels, various mythical aliens, and a sense-around radar.
Including the sort of full colour, smooth Hi-res graphics and sound, you have come to expect from Imagine games.
Keyboard or joystick control on any Vic-20.
Game design and software by Eugene Evans.

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"Well, if you brushed your teeth more often Malcolm, you wouldn't have to. Remember what that nice man from Imagine told you about those horrible DK's. They'll rot your teeth away if you don't brush them. And it's no use trying to clean them if you've no toothpaste on the brush. You had better stop eating all that junk food as well, it only makes the DK's even more evil."
Poor Malcolm. He didn't heed our warning and now he's suffering the consequences, Will you?
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# SECRETS OF THE SPIES

**BY KEITH CAMPBELL**

An Adventure can cover almost any storyline providing there is excitement.

This is where the use of "*special condition*" lines can be used.

Supposing our theme is a spy story and, briefly, part of the plot runs like this: The player has obtained some microfilm from a dead-letter box unknowingly watched by the opposition.

His next hurdle is to flee the country, but must first get hold of his passport, taken from him during an earlier encounter with the opposition. The position of the player is:

Inventory: REVOLVER — object no.1 i.e. P(1)=50 MICROFILM— object no.2 i.e. P(2)=50

Location: DARK ALLEY – loc'n no.10 i.e. LN=10

Exits: EAST. Destination = DIM BACK STREET (loc'n no.9) WEST. Destination = GUARDED WALL (loc'n no.11)

Therefore E$(10)="EW" and D$(10)="x911"

The story line of our sub-plot is to go like this: If carrying the microfilm in location 9 the player will see a suspicious stranger lurking (object no.3).

After five moves in this location the stranger will disappear into an unseen opening leading to location 12, which was not visible or accessible before.

If he follows, the player will get killed. But after three more moves, the stranger will re-appear. He will shoot the player after another three moves if not shot first.

If the stranger is shot before he enters the opening, that exit will never be available.

To program this, the stranger must appear as if from nowhere when the current location is the dark alley and object 2 is in the player's inventory.

"Nowhere" will be created by initialising the location of object 3 as a 88, a non-existent location.

Let us set up a count of visits to the location using the stranger's flag, C(3) which for reasons to be explained later will always be negative, initially −2.

Therefore we must count negatively:

110 IF P(2)=50 AND LN=9 THEN LET C(3)=C(3)−1 : LET P(3)=9

Now we must count five moves in this location before he disappears into the opening for three moves. This will be when C(3)=−7, −8, or −9:

120 IF C(3)<−6 AND C(3)>−10 THEN LET P(3)=12

We must comment on his disappearance and open up the new exit to location 12:

130 IF C(3)=−7 THEN LET Q2$= "STRANGER HAS DISAPPEARED" : LET L$(9)=L$(9)+" NARROW OPENING IN WALL" : LET E$(9)=E$(9)+"0" : LET D$(9)=D$(9)+"12"

To make him re-appear:

140 IF C(3)=−10 THEN LET Q2$= "STRANGER'S BACK" : LET P(3)=9

There is no need to re-assign his location, as it was set at 9 in line 110. Now he must shoot you if C(3)=−12:

150 IF C(3)=−12 THEN . .(go to suitable end of game message)

What we have not covered is the eventuality of the player entering location 12 while the stranger is there. Suppose we want the player shot, then we can adapt line 150 by inserting:

150 IF (LN=12 AND P(3)=12) OR C(3)=−12 THEN . . . .

But what if the player shoots the stranger? If this is done before he reveals the opening, he must be made to disappear forever in our SHOOT verb routine, to say location 99. Remembering that he started life at location 88, we must now amend line 110 to read:

110 IF P(2)=50 AND LN=9 AND P(3)<99 THEN . . .

Thus our count of moves will only operate whilst the stranger is alive, and the player is carrying the microfilm in location 9.

A final extra touch might be to provide for dropping the microfilm in location 9, when the stranger will snatch it and disappear. Using the above conventions and variables, see if you can write the necessary line!

## THE MAGIC OF FROBOZZ . . .

Two adventuring colleagues of mine who have access to a PDP-11 have been playing Dungeon from DECUS during their lunch breaks for the past 9 months.

They invited me over to join in, but I could see there was no chance I'd be allowed to lay a finger on the keyboard!

Before them lay a map almost a metre square, painstakingly built up during their exploration of this very large adventure-land.

They told me they had recently discovered how to operate the sluice gates, and successfully drain a reservoir. They were currently at the bottom of a dry well and the problem under discussion was how they might get out upwards, for they were sure there must be an exit that way.

"It's a magic well, so we must be able to do something pretty useful here. The most useful thing for us right now is to go up," explained Ian.

How did they know it was magic? "It's a FROBOZZ well, and all FROBOZZ products are magic", he replied. Well, of course!

Suddenly their concentration went back to the screen. A lean and hungry gentleman had just entered their vicinity, and without care on their part was likely to rob them blind.

I left them to it, wondering enviously whether I could afford a PDP-11.

Some weeks later I had a disc drive fitted to my TRS-80 and looking around for a disc Adventure, came across Zork.

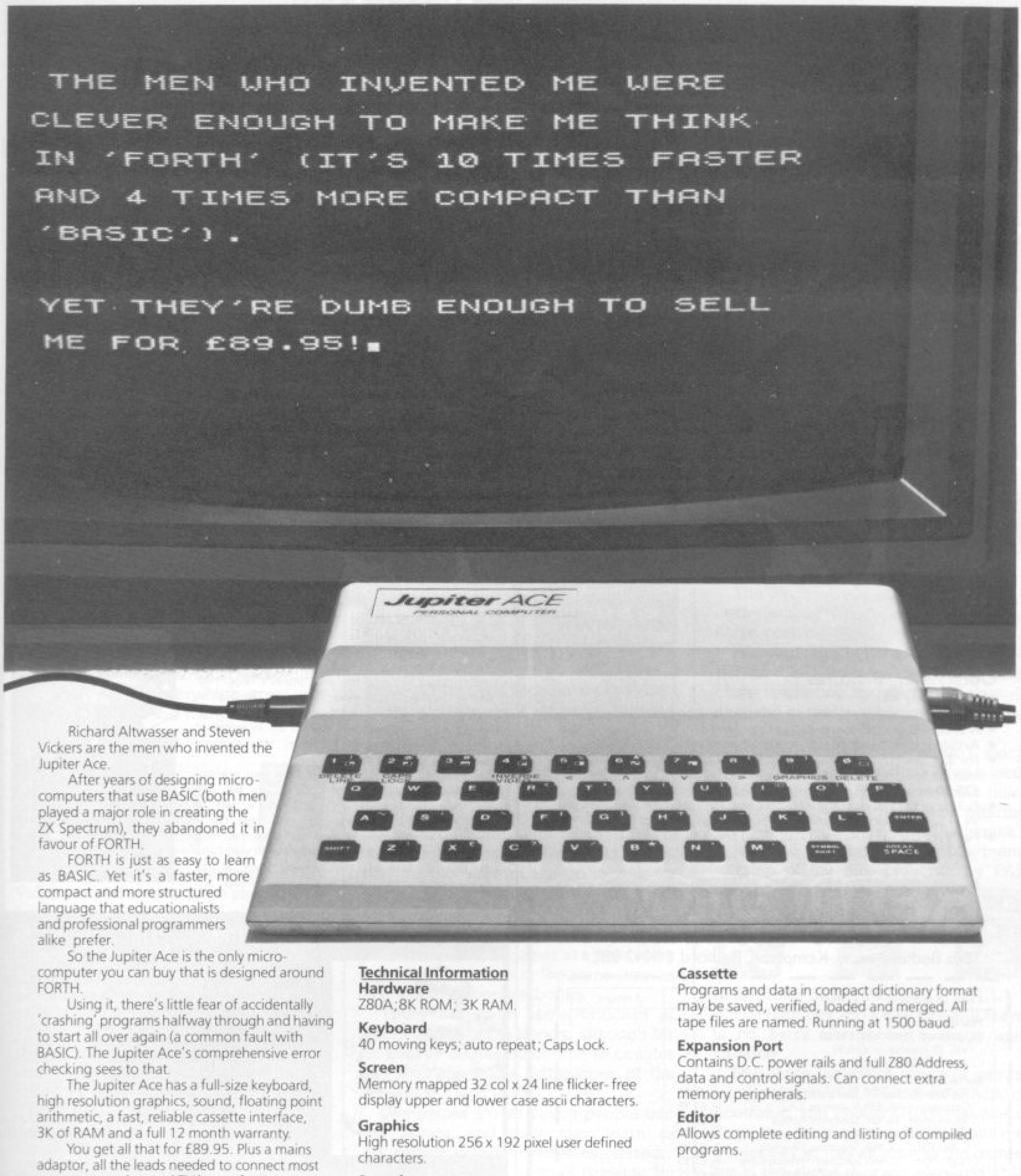
I was intrigued and amused by the replies, some of which were over a screenful of text.

Indeed, the game has commands VERBOSE BRIEF and SUPERBRIEF to limit these screenfuls if you are going through a part of the game you have already played.

Zork turns out to be Dungeon. It is available for 32k Atari from Calisto Computers, and 32k TRS-80 from Tandy. Both machines must have at least one drive.

I haven't yet drained a reservoir, or even found the magic well, but I've been places that my friends haven't even heard of. That's how big it is!

I wonder how many readers are currently playing this game in one of its forms?




Richard Altwasser and Steven Vickers are the men who invented the Jupiter Ace.

After years of designing microcomputers that use BASIC (both men played a major role in creating the ZX Spectrum), they abandoned it in favour of FORTH.

FORTH is just as easy to learn as BASIC. Yet it's a faster, more compact and more structured language that educationalists and professional programmers alike prefer.

So the Jupiter Ace is the only microcomputer you can buy that is designed around FORTH.

Using it, there's little fear of accidentally 'crashing' programs halfway through and having to start all over again (a common fault with BASIC). The Jupiter Ace's comprehensive error checking sees to that.

The Jupiter Ace has a full-size keyboard, high resolution graphics, sound, floating point arithmetic, a fast, reliable cassette interface, 3K of RAM and a full 12 month warranty.

You get all that for £89.95. Plus a mains adaptor, all the leads needed to connect most cassette recorders and T.V.'s, a software catalogue (35 cassettes available, soon to be 50), the Jupiter Ace manual and a free demonstration cassette of 5 programs.

The Jupiter Ace manual is a complete introduction to personal computing and a simple-to-follow course in FORTH, from first principles to confident programming.

Plug-on 16K and 48K memory expansions are also available, at very competitive prices. (There'll be a plug-on printer interface available soon, too.)

It'll take you no time at all to realise how clever Richard and Steven were to design the Jupiter Ace around FORTH. And even less time to realise what a silly price £89.95 is to charge for it.

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Z80A; 8K ROM; 3K RAM.

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* Radar Scanner display in hi-res *
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* From the author of Spectrum 'Scramble' *
* 100% machine code *





### SPACE ZOMBIES (16K) £5,95

Shooting through space you are ambushed by a fleet of Space Zombies flying at you in formation, swooping and diving at you. Destroy them, if you can! But in destroying them, you attract more to the area, and the game gets progressively harder.

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*Three playing speeds *

### MINES OF SATURN and RETURN TO EARTH £5,95

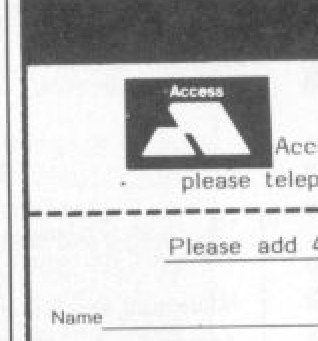
(16K) Text Adventure

**Mines of Saturn** While piloting a routine orbit of Saturn, you are caught up in a radiation storm which forces you into the giant planet's rings. Your energy drained, you make a forced landing on the planet's surface. Luckily you crashed near an abandoned mining base and you set off in search of some di-lithium crystals to refuel your stranded space ship. Can you do it?

**Return to Earth** Having escaped from your previous dilemmas, you reach Earth Station 1, but fail to make radio contact. You effect a safe if harrowing manual docking. On entry you find it deserted, and the control room destroyed. You must explore the station and find some way to alert Earth of your predicament, but beware, many of the rooms are identical, there is extensive damage, and signs of alien intruders.



Graphic Adventure (48K)



### MAD MARTHA £6,95

Poor little Henry is the hen-pecked hero of this domestic tale. One night he can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun. Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table. Just as Henry is getting into his evening his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe. Guess what part you play in this happy tale? That's right, you're Henry. Watch out for that axe!

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# HIRE AND FIRE!



**BY EUGENE LACEY**

**Blowing up video aliens is great fun — but it can cost a bomb to save the universe!**

**With the best new games retailing at anything up to £30 *Computer and Video Games* decided to take a look at a cheaper way of playing video games. And we found that the key to cost cutting may be found at your local video hire shops, where among the films you may find video cartridges available for rent.**

In our quest for the cheaper way to play we found that rental prices vary tremendously — but an average price to aim for is around 50p-a-day for a top-of-the range game like Star Raiders or Pacman.

Hardware units are also offered for hire by some of the high street television rental shops.

Radio Rentals were the first people to start hiring video games a year ago when they offered the Intellivision for hire. You can get one for £5.95 a month, or £4.95 if you already rent a television from Radio Rentals. For the price you get the Master Component and a soccer cartridge, plus one other cartridge of your choice.

Radio Rentals policy on the games cartridges themselves has always been to sell rather than hire — but this is likely to change if a scheme currently being tried out in the North West proves successful. In certain shops in the region the firm is hiring out the Mattel range of games on a weekly or daily basis.

If you don't have a Radio Rentals shop near you then you may also be able to rent games from your local video-films hire shop. Almost every high street now has a video shop and many newsagents stock them as well.



A typical scheme is operated by Easy Video Limited at their three shops in the London area. You can hire a top of the range game for 50p a day. Games which are cheaper to buy are also cheaper to hire. These go down to about 20p a day.

Hardware units come considerably dearer at between £5 and £7 a week.

Soni Dosaj of Easy Video said the main advantage of hiring a cartridge was that it gave you an opportunity to give the game a thorough testing in your own home before you decide to buy. There must be at least one game in your collection which seemed like a good buy at the time but after the first couple of weeks hardly ever gets played. Hiring should enable you to tell whether a game stands up to the two-week test.

Your local public library may also soon be stocking video games for hire. Surrey Library Department now has video games for hire in seven of its branches. They offer the complete range of Atari VCS cartridges, with Imagic and Activision titles shortly to be added to the list.

During the 18 months the scheme has been running it has been an enormous success. The demand for games has been so great that the proceeds have recouped the initial outlay and the scheme is now self-financing.

The chief librarian of Surrey Library Services Mr Douglas Betts, told *C&VG* that people often queue up to wait for games to be returned so that they can hire them.

Surrey charge 50p per week and you can hire up to four games at a time using your library tickets in the same way as you would to borrow books.

There has been some criticism of video games in the library, although Mr Betts says he has been able to counter this with the many advantages of the scheme.

The games attract young people into the library and they may learn to appreciate the other services offered.

It also provides a small revenue for the library, and is the first step towards the "library of the future" which will provide educational and instructional software not only for video games units, but also for home computers and video recorders.

Technology is also cutting the costs of playing games.

In the US you can play a game using a telephone link in a similar way that microcomputer owners can get access to games, via Prestel, and the new Micronet 800 system in the UK.

The American system is based on a special adaptor which is supplied by the telephone company. This takes a signal down the telephone cable to your home which is then converted into a games program for your Atari VCS or Intellivision.

The charge for the game is then made at the end of the month when you receive your telephone bill.

Although hire is not as popular in the U.S. as it is here, one nationwide hotel chain is offering its guests a Colecovision and cartridges to hire for the duration of their stay.

If your local library doesn't stock video games and you don't have a local video films hire shop, there are a number of hire by mail firms now offering competitive schemes on video games.

Just £10 will buy you a life membership of the hire club run by E&E



Enterprises of Cornwall.

You then pay 25p a day hire and there is no extra charge for postage and packing.

E&E stock the entire range of games for the Atari VCS, Mattel Intellivision, Acetronic, and Philips G7000 machines. They buy their games direct from the wholesaler so that as soon as the games are in the shops they are also available for hire from E&E.

As official buyers for the Video Traders Association, Easy Video are also offering a hire service to individual shops who can then hire the games out to their customers.

Games Galore, a Slough based firm, offers a range of games for the Atari.

An annual fee of £40 enables you to borrow the games at no extra charge.

So if you want to play all the latest video games without breaking the bank the best advice *C&VG* can give is hire and fire folks!

# ROMIK SOFTWARE

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**ROMIK PROMISE A MINIMUM OF ONE NEW GAME EVERY MONTH**

## STRATEGIC COMMAND
### by Alan J. Ovens

For the Dragon Computer.
As the name suggests Strategic Command is a game of strategy for two players, the object of which is to overrun the opponents capital. Each player has a capital that contains: 2 battleships, 3 destroyers, 1 aircraft carrier, 2 cruisers, 1 heavy artillery gun, 2 light tanks, 2 main battle tanks, 1 mechanised infantry unit. Each player also has a naval base with; 1 battleship, 2 destroyers, 1 aircraft carrier, 1 mine layer, 2 mine sweepers, 2 submarines, 3 patrol boats, 3 cruisers.
Each player also has an army base with; 1 mine layer, 2 light artillery guns, 2 mine sweepers, 1 main battle tank, 3 mechanised infantry units, 2 light tanks, 1 heavy artillery gun, 3 reconnaisance units. Each player can create up to ten task forces, of up to three units at any one time, mine fields can be laid, and swept, naval forces can engage, or be engaged by land forces if they come close enough, and up to three task forces from each side can engage each other in battle. There is also an air reconnaisance facility.
The game takes a few minutes to learn, but can take anything from a few minutes, to several hours to play, depending on the skill of the players.

## MARTIAN RAIDER
### by Cliff Ramshaw

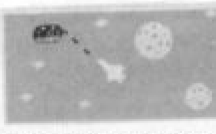


Our top selling game for the unexpanded VIC 20, Martian Raider is a machine code, arcade quality game. You are the pilot of an intergalactic battle ship, your mission is to bomb the cities, ammunition dumps, and ground to air missiles of the evil Martian overlords. Attacking you are the U.F.O.s, meteorite storms, and the ground to air missiles. All of which (if you are quick enough), you can shoot down. You have a limited time to complete your mission. But this time is extended each time you hit an ammunition dump. If you lose one of your three lives (a bonus life is awarded at 10,000 points) you will get additional time with the new life. There are several different screens which advance automatically during play, superb graphics and action. Uses joystick, or easy to use keyboard controls.

## MULTISOUND SYNTHESISER
### by Darren Hall

For the unexpanded VIC 20 (in machine code of course) the synthesiser is split into four main sections. 1, normal; 2, normal with drum; 3, programmable background music; 4, white noise.
Each section is accessed by pressing one of the four function keys.
Music can be played like a normal organ or synthesiser by using the 2 rows of keys "Q" to "*" & "A" to "=". By pressing certain keys, different harmonics and sound effects may be created. Up to 4 tunes of up to 255 notes each can be created as background music, and can be saved to tape for reloading at a later date. A background tune plus the drum beat (choice of 6) can be played together, and at the same time you can play another tune over the top, the rhythm can be speeded up or slowed down, etc., etc., etc.

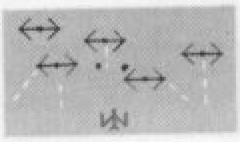
## MOONS OF JUPITER
### by Dave Byrden



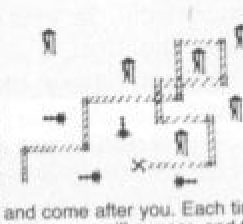
For the expanded VIC 20. Will run in 3K and/or 8K and/or 16K.
Moons of Jupiter is a machine code arcade quality game with absolutely brilliant actions and graphics, with 3 skill levels. The game is similar in concept to asteroids, but with better action and graphics: you have to shoot the moons which then break up into smaller fragments, which you also have to shoot and yet again they will break up, all the time coming at you from different directions and at different speeds. Watch out for the U.F.O.s, but even more deadly are the Gologs, these you cannot shoot, you have to lure them into the moons to destroy them. You start with 5 lives and gain one additional life each time you clear the screen. Uses joystick or easy to use keyboard controls.

## SPACE ATTACK
### by Cliff Ramshaw

For the unexpanded VIC 20.
Space Attack is a machine code arcade quality game with extremely good graphics, and 3 starting skill levels.
There are four different waves of different alien space ships, which attack you (as the pilot of an inter galactic battleship) with increasing speed and ferocity, each wave coming faster than the last, and shoot in up to three different directions as they attack, making dodging them extremely difficult, you more or less have to keep firing and moving all the time.



## SHARK ATTACK
### by Cliff Ramshaw

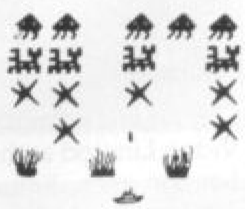


For the unexpanded VIC 20. Shark Attack is a machine code, arcade quality game. You have only three lives. You are in shark infested waters after being thrown overboard from a pirate ship. Your only protection being an atomic net which you trail behind you. Trying to trap the sharks (hopefully all together) and procede to fill the screen with the net. If you stop, or cover your tracks for too long the sharks will escape and come after you. Each time you will fill the screen with your net. The screen will clear, two octopuses will appear, and the sharks will increase their ferocity of attack. Each additional time that you fill the screen, two extra octopuses will appear, and the sharks will grow more ferocious. Uses joystick, or easy keyboard controls.

## SPACE FORTRESS
### by Darren Hall

For the unexpanded VIC 20, available early February. Space Fortress is a machine code arcade quality game with brilliant action and clean very attractive graphics, and absolutely amazing sound effects and probably the best game for the VIC 20 from any manufacturer to date. There are 20 skill levels, but you always start at skill level one, first of all you are attacked by 3 waves of the suicide squad, then 3 waves of sidewinders then 3 waves of sistorian swoopers. Finally you are attacked by the purple avengers. All these different deadly defence forces attack you using different methods of attack. After you have destroyed the last wave of purple avengers, the Space Fortress appears, this you have to shoot down before it puts up its defence shields and disappears into hyperspace. If you shoot it down you advance to the next skill level. If you fail, you go back to the skill level that you were on. Each time you destroy the fortress you gain an additional life (you start with 5).

## SEA INVASION
### by Cliff Ramshaw



Sea Invasion is a machine code, arcade quality game, similar in concept to "Space Invaders" but much better in many respects. There are five skill levels; 1, beginner; 2, trainee; 3, semi-professional; 4, professional; 5, ace; so no matter how fast or slow your reflexes are, there is a speed to match your skill. Unlike Space Invaders, the creatures do not move left then right, etc., but move off the right of the screen, and come back from the left, so there is no safe place to hide. Uses joystick, or easy keyboard controls.

## SUPER NINE
### by Ian Morrison and David Anderson
*for the unexpanded ZX81*

Altogether there are nine machine code games, all on the one tape. CANYON: you have to guide your space ship along a canyon which gets progressively narrower. 50 skill levels and 50 speed levels.
ASTEROIDS. You have to guide your ship across the screen, avoiding the asteroids. 10 skill levels. 50 speed levels.
ASTRO BLASTER. The object of the game is to shoot down the fireballs, asteroids, and enemy craft.
DEFENDER. The object of the game is to shoot down the enemy craft and save the humanoids.
SQUASH. A two player game of squash, both players being able to move simultaneously, the loser being the first one to miss the ball 3 times.
SCRAMBLE. You have to avoid the mountainous landscape, shoot down the rockets and blast the ammunition dumps.
SKETCH. Create your own pictures on your TV screen, with rub out facility, also you can copy your artwork to the ZX printer.
COSMIC RAIDER. You must shoot down the aliens whilst avoiding the clouds and mountains.
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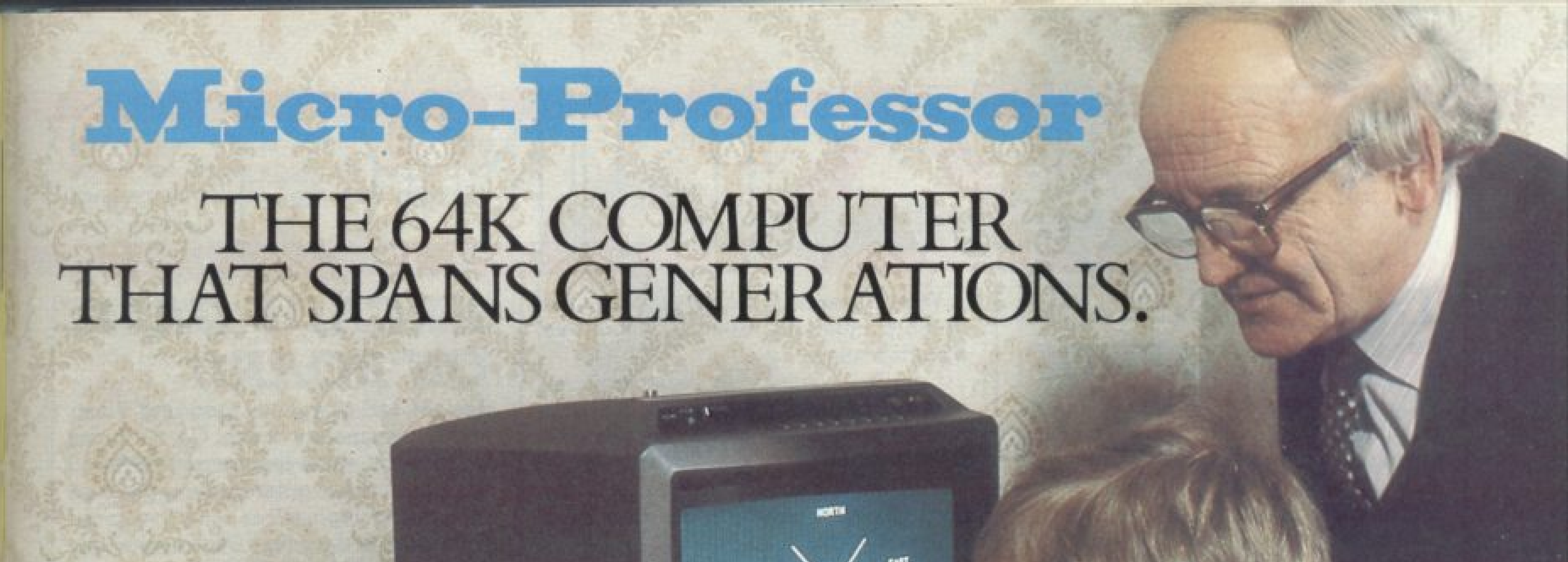
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# PUZZLING

## TRY THIS TRICK SWITCH

Visitors to Matilda the witch's house, after negotiating the tricky landing among the chimney stacks and finding a safe pot to drop in by, find life inside just as complicated.

Matilda is always trying to rearrange her cumbersome furniture — so large that only one item at a time will fit into each tiny room.

Spells are of no help — in fact they led to the present disorder. What is needed is a solid spot of weightlifting.

Only one object can be moved at a time into the only empty room. Each room is connected to the room next door on the same level and, by stairs, to the room immediately above or below it.

The problem is that the clock must change rooms with the book and the cauldron needs to be where the bed is and *vice versa.* The setee is already in the right place.

What is the least number of times the objects must be moved to achieve Matilda's aim?

Labelled counters or paper squares can be placed on our picture and pushed around to simulate the removal men.

You can record your effort by noting the one empty room after each move is made.

### MELTING POT

Matilda, the wicked witch has, without any great originality, called her house The Cauldrons. As most of her visitors travel by broomstick, the house name is painted, rather decoratively, on the roof.

If you can move from tile to adjacent tile — either straight down or diagonally, just how many different ways are there to spell CAULDRONS?

You can spend most of your holiday trying to count them but there is a much easier way of finding the answer — and perhaps the rest of the tiles on her roof may be of help!

## ARCADE GAME ON BOARD

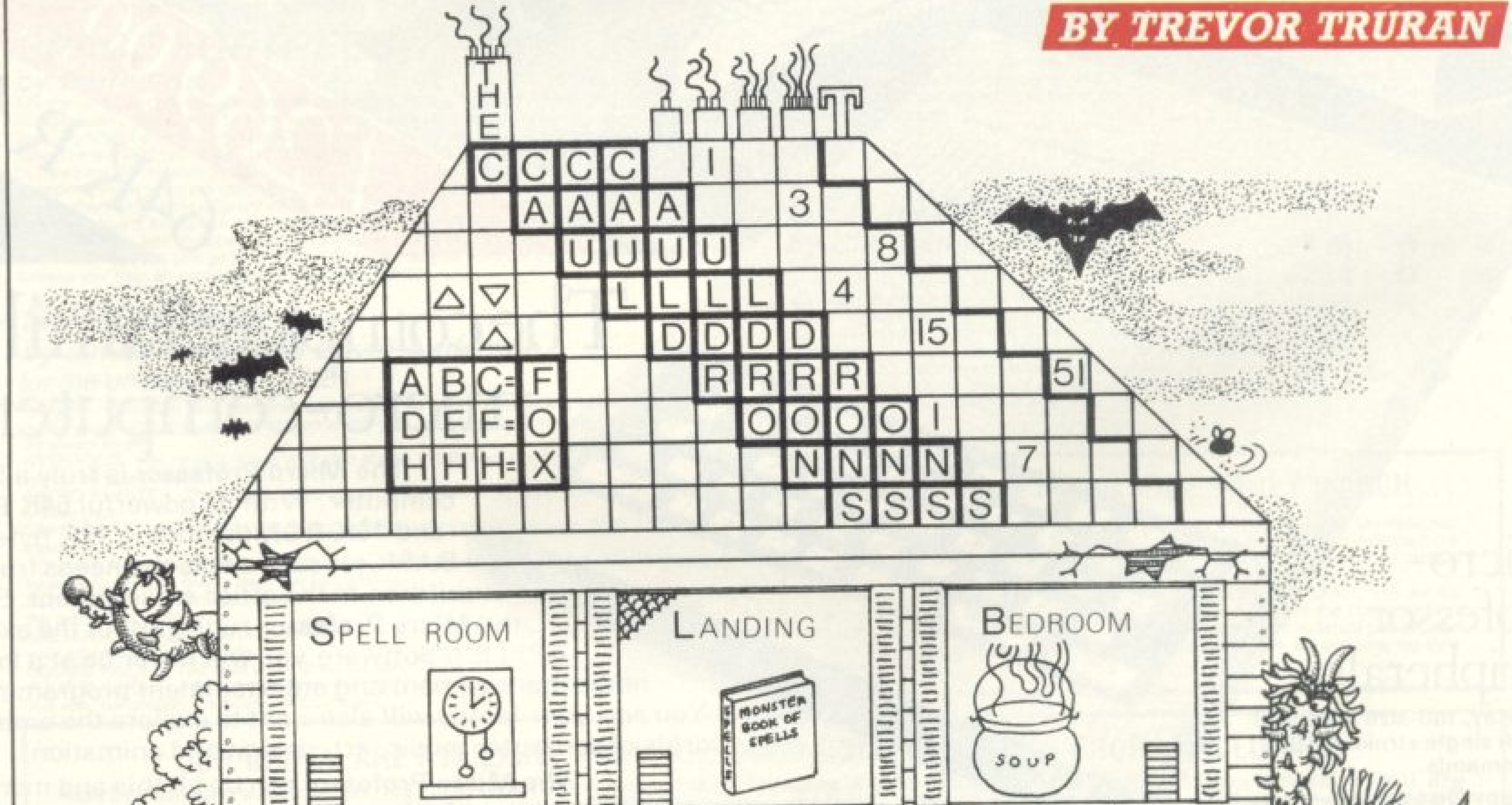
The ACME Spaghetti, Bedding Plants and Interplanetary Travel Co, not being in quite the same league as NASA and the Russians has entered the space race on a microchip scale.

So slow is their first Delta rocket that time, even in zero G, hangs heavy on the hands of the crew. To pass the dayless months away they have taken the headline of the last newspaper the saw before leaving Earth and are attempting to form new words from it.

On each new line one letter must be dropped from those used in the line above and those left must form a new word or words. A word, to be valid, must be of three letters or more and must be a bold type entry from *Chambers Twentieth Century Dictionary, (revised ed.).*

Words must not overlap along the line and must be separated by a bar. A word once used must not be repeated.

**BY TREVOR TRURAN**




Illustrations: Dave McTaggart

# PUZZLING

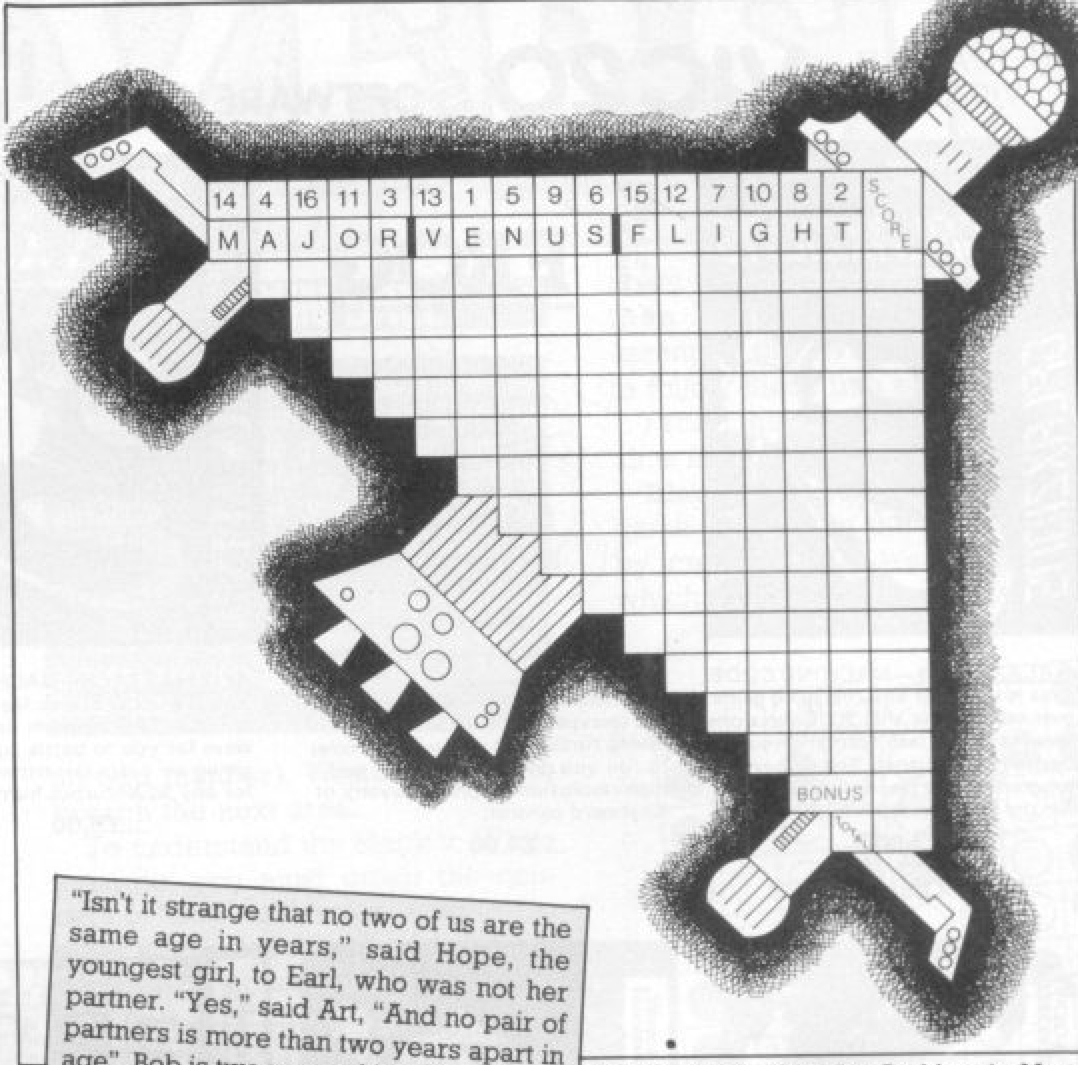
Each line scores the total of all the letter values which appear in it. These values are shown above the top line, so hanging on to your J or your F might be a good idea.

Before finding the grand total by adding up the scores for each line, bonuses can be gained for each word which is of five or more letters. The bonus is one point for each letter in the word; a five-letter word gains five points, a six-letter word six points and so on.

ACME ground control reports that the navigator aboard the spaceship had just recorded a splendid new high score and was about to give the details when the telephone line linking them to Earth finally broke.

The company has therefore decided to extend an invitation to the readers of this magazine to submit their best efforts and has coerced **Milton Bradley** into donating three of their range of six arcade board games. The range includes Pacman, Frogger, Donkey Kong, Defender, Berzerk and Zaxxon. To enter, send in the diagram, or a copy of it, with your words, score for each row, bonuses claimed and final total to reach us by May 12.

The first three prizewinners highest scoring entries will each receive a prize — provided they remembered to include their name and address! Usual competition rules apply.







*How far is it to Lacdyffinis?*

"Isn't it strange that no two of us are the same age in years," said Hope, the youngest girl, to Earl, who was not her partner. "Yes," said Art, "And no pair of partners is more than two years apart in age". Bob is two years older than Hope's partner.

Pluto's partner and Earl are two years apart in age. Charlotte is one year older than Ida. Pluto, while three years older than Hope's partner, is younger than Ida.

Fran's partner and Pluto are four years apart in age. Fran and Bob are four years apart in age.

When you know that Fran is 25-years-old, you can work out the age of Earl, can't you?

By Paul McLenon

Farmer Nure's Blooming Problem in March proved that we don't number many horticulturists among our readership.

Trevor Truran finally managed to outsmart most of you by the convoluted thinking and only two readers entered a correct solution.

Mrs M. Barker of Aireville Close, Keighley in Yorkshire and Alan Northcott of Reading Road, Winnersh, Wokingham discovered the secret of the red, white and blue blooms.

Their reward is a Vulcan Electronics Hungarian Ring to puzzle over. The other eight rings we will hold back for a future competition. Our commiserations go out to all the rest of you who sweated over the problem with a ball-point pen poised.

## *SOLUTIONS*

1+2+3=6 and so on. (The three triangles further suggest "three".)

Those mathematically minded may deduce the result by noting that the totals for spelling C, CA, CAU, CAUL are 4, 9, 18, 32 and work out that the formula

$$\frac{(N+1)\ (n+2)\ (N+3)}{3!} — (n-1)$$

Where N is the number of letters in the word, gives a general solution.

**CRYPTIC COUPLES**

Earl is 26 years old. The partners and their ages are:
Art (19) and Hope (20).
Earl (26) and Fran (25).
Bob (21) and Ida (23).
Pluto (22) and Charlotte (24).

**CAULDRONS**

212. The number of ways of spelling C, CA, CAU . . . starting from each C in turn can be entered onto the tile spaces on the right. Some of the answers have been filled in as clues.

From filling in the top few lines it will be apparent that each number is the sum of the three numbers in the row above, diagonally to the left:

1 + 1 + 1 → 1
1 2 3 3
1 3 + 6 + 8 →
1 4 10 47

By completing this table of answers the total can be found by adding together the four numbers in the final row: 1+9+45+157.

A further clue is given to the left of the main letters ABC=F A=1, B=2 . . . and

**WITCH SWITCH**

18 moves. As in this sample, shown by the initial letter of the empty room: L, B, K, H, L, S, D, H, K, B, L, H, D, S, L, B, K, H.

**HOW FAR?**

How Far? 452 miles. In each word the distance is equal to the sum of the roman numbers which are included within it.

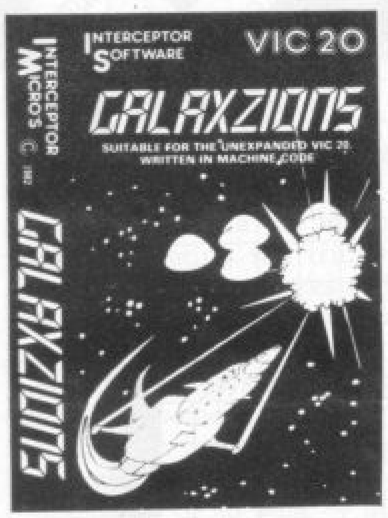
Thus LIVerpooL = L+IV+L = 104, CarDIff = 100+500+1=601, LaCDyffInIs =50+400+1+1=452.

NOTE: CD=400 not 100+500 just as the IV in Liverpool equals 4 and not 1+5; i.e. numbers are read in conventional terms.)

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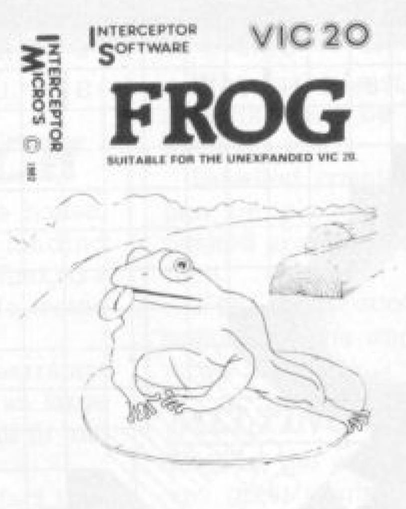
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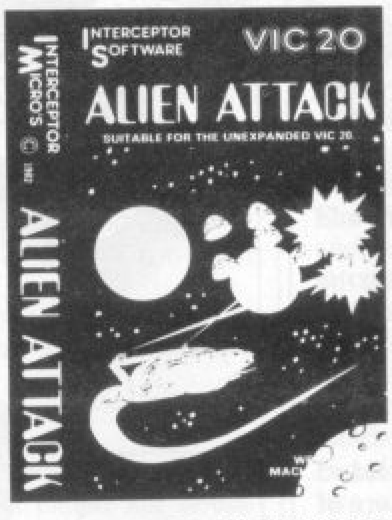
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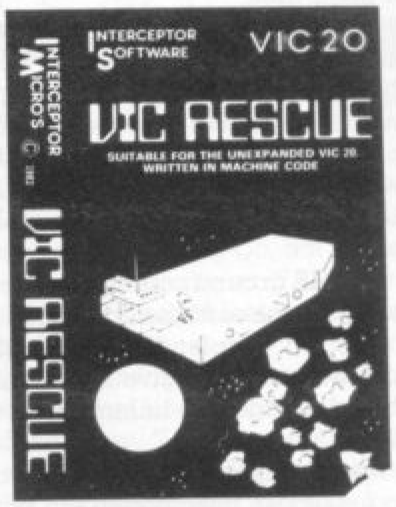

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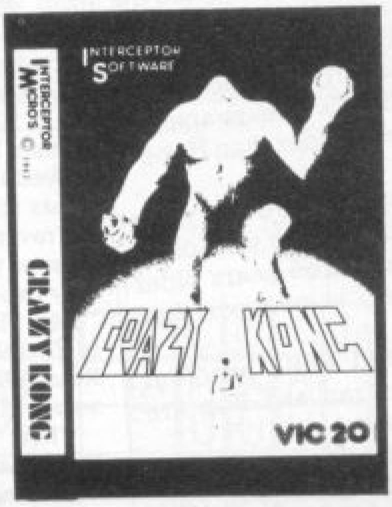

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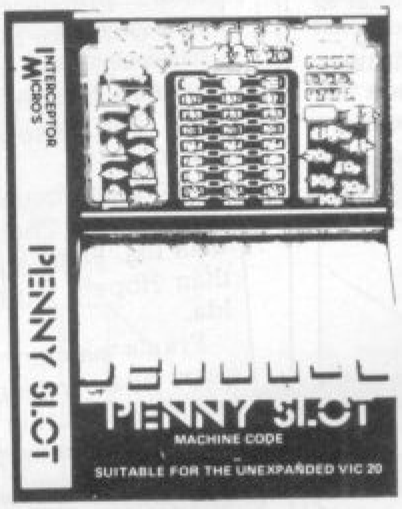

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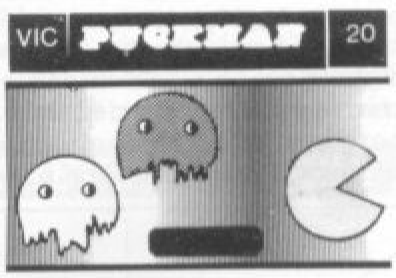

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# REVERSI

## BY JOHN BALL

**When playing Othello, also known as Reversi, do you prefer to be Black or White? In all logic games, one side is commonly thought to have a slight advantage, such as White in chess. The world-wide preference for Othello is Black.**

**According to the international Grapevine, top American and Japanese players are now favouring White. About time, too!**

## *ODD AND EVEN PREJUDICE*

Understanding this controversy will improve your, or your computer's, skill. Black seems to have an advantage in the opening, though why is difficult to explain.

Black's first move is forced by symmetry, as A in diagram 1, but all of White's replies (B's) allow Black to play good moves, as defined in the previous article on openings. From then on White has to tread very warily.

Black seems to have more opportunity to remove "safe" moves from White. The end result is that White should be under pressure throughout the game.

Black should try to capitalise on opening gains by aggressively destroying White's "options" (choices of sensible moves). This can mean taking sides more willingly.

White should be frugal with his own options, his aim being to survive to the end-game.

### *BLACK'S POWER*

If you look at the alternative starting position (allowed in Reversi, but not in Othello) as shown in diagram 2, you will find that Black has even more pressure after move C.

White D and Black E are typical replies and reveal the source of Black's power — the odd number of squares in the inner corners (i.e. C, D and E are three squares which is an odd number). White then has to breach the next area.

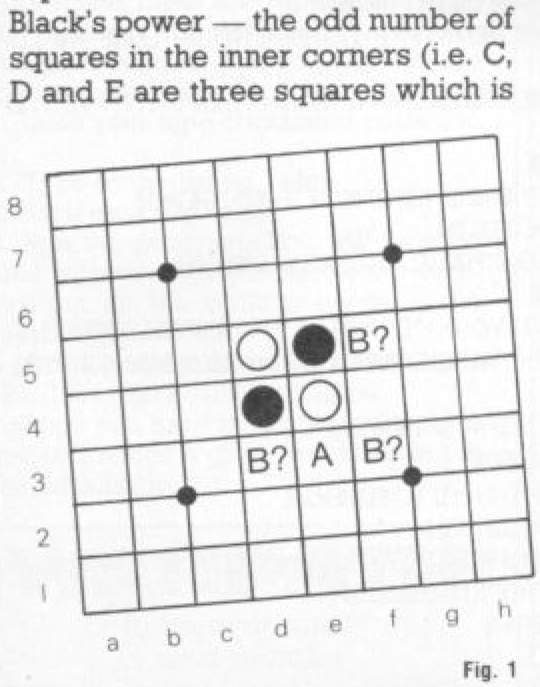



Fig. 1

To understand the Black v. White struggle, you must grasp the concept of "odd" and "even" areas — in other words areas with odd or even numbers of spaces.

### *SUBTLE DOUBLETS*

After the opening, Black comes up against even areas, and has to use his ingenuity to create odd areas.

White on the other hand is happy to have even play, due to doublets in the end-game.

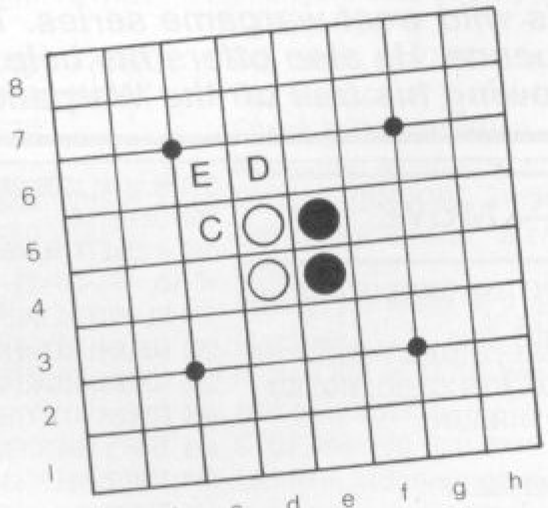



Fig. 2

These "doublets" are really the final even groups of spaces split up into pairs. Examples are FF, GG and HH shown in diagram 3.

To play in one space would invite your opponent to play in the other paired space.

It is an advantage to be the second player, as it wins you corners or sides. Indeed throughout the game, there are more subtle "doublets".

As Black started, if the end-game splits up into a series of doublets, then Black will lose each one, assuming that White has the sense to follow Black into each doublet.

From this, a big difference in aims is raised for Black and White.

**Black's purpose** throughout the game is to make the game odd — by creating odd areas, ideally in which only Black can play. Black then avoids odd areas unless there are an even number of them. This puts White in doublet trouble.

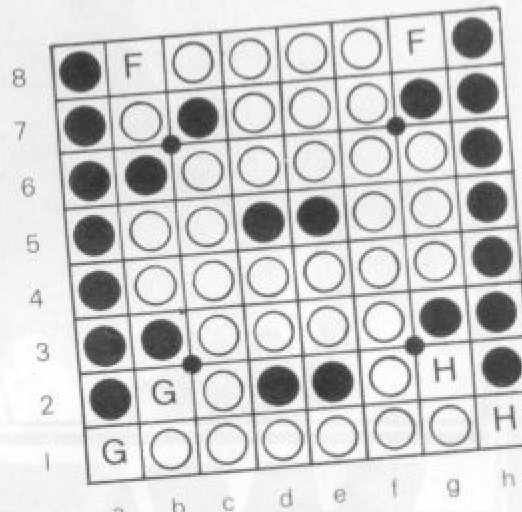



Fig. 3

**White's purpose** throughout the game is to make the game even, by creating even areas, forcing Black into doublet trouble.

Usually the best Black can do is stave off the doublet trouble until the last two or four spaces. If he can keep it odd to the end — a rare event — he has usually won.

So if you are good at surviving early on, you should have more chance of winning as White, now that you know about the even and odd doublet battle.

For four years now, former British champion John Parker and myself have spoken out in favour of White as giving the best opportunities.

According to the international grapevine, top American and the brilliant Japanese players are now switching their allegiance to White as well. And about time too.

Unlike chess, where the large number of opening moves means that the first mover can dictate the way the game develops initially, the first mover in Othello is limited to just four, all causing identical positions.



**Welcome back partners! Hope you all are ready to git back on the trail agin!**
**This time our trail-boss Ron Potkin is looking at the input routine. But first here's a few words about moving about in the wild western world of Warpath.**

**Movement Phase — Other options:**

**STOP — To stop a piece before all moves are spent, press "S".**

**HOLD — The pieces flicker in a predetermined order. If you wish to hold a piece until the other pieces have moved, press "H". This helps when a portion of the board is congested. The piece will flicker when the other pieces have moved.**

**CHANGE SIDES — If you decide that all movement is complete even though some pieces have not moved, press "C". This will cause the TRS-80 to prompt for any pieces on "HOLD" and then move into the attack sequence.**

**LEAVE THE FLAG — The piece in the hex containing the Flag will always move the Flag as it moves. If you wish to move the piece without the Flag, press "L".**

# WARPATH

*Part five of Ron Potkin's wild west wargame series. This month Ron gets things moving in the right sequence. He also offers his help to anyone having problems following his trail on the Warpath so far.*

## WARPATH Part 5 — MOVE

```
70 PRINT@0,CHR$(30);:PRINT@0,I$"(BOW)"SV(1)I$"(TOM)"SV(2)"HORSEM
EN"SV(3)T$SV(4);:IFSV(5)THENPRINT"+ GENERAL";
80 IFSV(1)+SV(2)+SV(3)>0THENRETURNELSEGOSUB430:GOSUB340:GOSUB340
:PRINT"ALL "I$"S"E(2)T$" WIN":GOSUB340:GOSUB340:GOSUB120:GOTO70
100 IFPLTHENT=1:T1=25:RETURNELSET=26:T1=50:RETURN
120 IFINKEY$=""THENRETURNELSERUN
160 Q9=0:FL=H(TP):IFBL=SFTHENQ9=1:RETURNELSERETURN
270 PRINT@SP,"  ";:GOSUB430:PRINT"H.Q. CAPTURED   "I$"S WIN....
.";:GOSUB510:PRINT@SP,FL;:GOSUB510:GOSUB120:GOTO270
310 IFBL<>SFTHENRETURNELSES=SP+VF(X)+3:PRINT@S,CHR$(186);:GOSUB4
30:PRINTI$"S CAPTURE FLAG!":PRINT@S," ";:GOSUB120:GOTO310
330 IFQ9=0THENRETURNELSESF=BL:IFSF<>701THENRETURNELSEPRINT@SP,D;
" ";:GOSUB400:BL=SF:GOSUB410:PRINT@SP,FL;A1;:GOSUB430:PRINT"FLAG
 IS HOME!"T$" WIN":GOSUB120:GOTO330
340 FORI=1TOW2:NEXT:RETURN
450 NX=USR(BL):IFPEEK(S9)<>255THEN520ELSENX=0:RETURN
460 A=INKEY$:IFA=""THENGOSUB470:GOTO460ELSEX=VAL(A):IFX<7THENRET
URNELSE460
470 GOSUB510:PRINT@SP,G;:GOSUB510:PRINT@SP,FL;:RETURN
480 FORI1=1TO9:GOSUB470:NEXT:RETURN
490 G="HOW":GOTO480
510 FORJ1=1TO20:NEXT:RETURN
520 NA=0:IFNX>50OR(NX<26)=(T<26)THENRETURNELSENA=1:RETURN
530 S=SP+VF(X):PRINT@SP,D;:PRINT@S,FL;:IFR2THENRETURNELSEIFBL=SF
THENPRINT@S+3,A1;:PRINT@SP+3,CHR$(128);:RETURNELSERETURN
540 PL=1-PL:GOSUB70
550 GOSUB100
560 A=INKEY$:BL=ABS(PC(T,0)):IFBL=0THEN720ELSETP=PC(T,1):KH=0:MV
=3-(BL=SF)-(TP=2)-(TP=5)-3*(TP=3)
570 K1=MV:IFKLTHENIFPC(T,0)>0THEN720ELSEPC(T,0)=BL:KD=KD-1
580 GOSUB410:LF=0:R2=0
590 GOSUB160:G=RIGHT$(STR$(MV)+"  ",3)
600 GOSUB460:IFXTHEN640ELSEIFLFTHEN600
610 IFA="L"THENIFSF=BLTHENQ9=0:LF=1:GOSUB430:PRINT"LEAVE THE FLA
G!";:GOTO590ELSE630
620 IFA="S"ORA="C"THEN680ELSEIFA="H"ANDK1=MVTHENPC(T,0)=-PC(T,0)
:KD=KD+1:GOTO720
630 GOSUB490:GOTO590
640 GOSUB500:IFPLAND(NB=822)THEN270ELSEIFNX<>ZTHEN630
650 BL=NB:IFLF=0THENGOSUB330
660 PC(T,0)=BL:POKEV3,Z:POKEV2,T:GOSUB530:GOSUB400
670 IFPLTHENGOSUB310
680 IF(TP=2)AND(MV<>1)AND(A<>"C")AND(A<>"S")THEN700ELSEPOKES9,6
690 GOSUB450:IFNXTHENIFNATHENGOSUB410:G="xxx":GOSUB480:GOTO720EL
SE690
700 IFA="C"THEN730ELSEIFA="S"THEN720
710 MV=MV-1:IFMV>0THEN580
720 IFA<>"C"THENLF=0:T=T+1:IFT<=T1THEN560
730 KL=0:IFKDTHENKL=1:GOTO550
740 GOSUB430:GOSUB100:FORI=1TO50:PC(I,2)=0:NEXT:FORK=TTOT1:BL=AB
S(PC(K,0)):IFBLTHENPRINTK;:GOSUB1230
750 GOSUB430:NEXT:RETURN
1230 RETURN     'STUB
```

Are you finding the coding tough? It is always difficult to follow someone else's program, let alone one that has been written on a computer other than your own. The Editor and I are anxious to provide assistance to help you, so if there are any difficult points, please write and let us know.

Machine code is a challenge to convert and, as one reader has pointed out, could mean a complete rewrite.

You will find it helpful to study Ted Ball's series of articles on machine language in this magazine because this compares the code for all the popular chips. Remember, however difficult it may appear, don't give up in despair! Write in and tell us the problem.

I told you in my last article that we had completed a module which would enable you to write several wargames. We must now start to concentrate on the detailed programming for WARPATH and this month I intend explaining the input routine.

Now that the SEARCH routine is included, we can now look at the coding required to move a piece. Intertwined is a routine to test for pieces on HOLD.

You will also see that flags are needed to provide for a man in the FLAG hex and for the man who wants to move without the FLAG.

To assist you, figure 1 is an explanation of every line from 540 to 750. Line 840 controls the whole program.

The main input handling routine is handled by lines 460/470 which will accept any number from 1 to 6 or a character.

Fortunately, the VALue of a character is zero which is very convenient. Line 480 handles errors; instead of the number of moves, it flickers "HOW".

Line 1230 is a STUB. This leads into the COMBAT routines which we will start work on next month.

Once you have entered this month's listing, there will not be room for the remainder of the program.

An inspection of the program shows that the DATA statements take up a great deal of space, and as you by now appreciate, these are superfluous once the information is loaded into the strings. I suggest that you work in the following manner:

1. Load your tape containing parts 1 to 4.
2. Type in the listing below.
3. Save on a new tape.
4. Run the program. You will now be able to move the pieces on the map. Try out all the options given in the rules.
5. Once you are satisfied, delete lines 791, 1084, 3000-3150, 5198-5400.

Once you have made these changes you will notice a great improvement in the initialisation.

**WARPATH**

**to be continued next month**

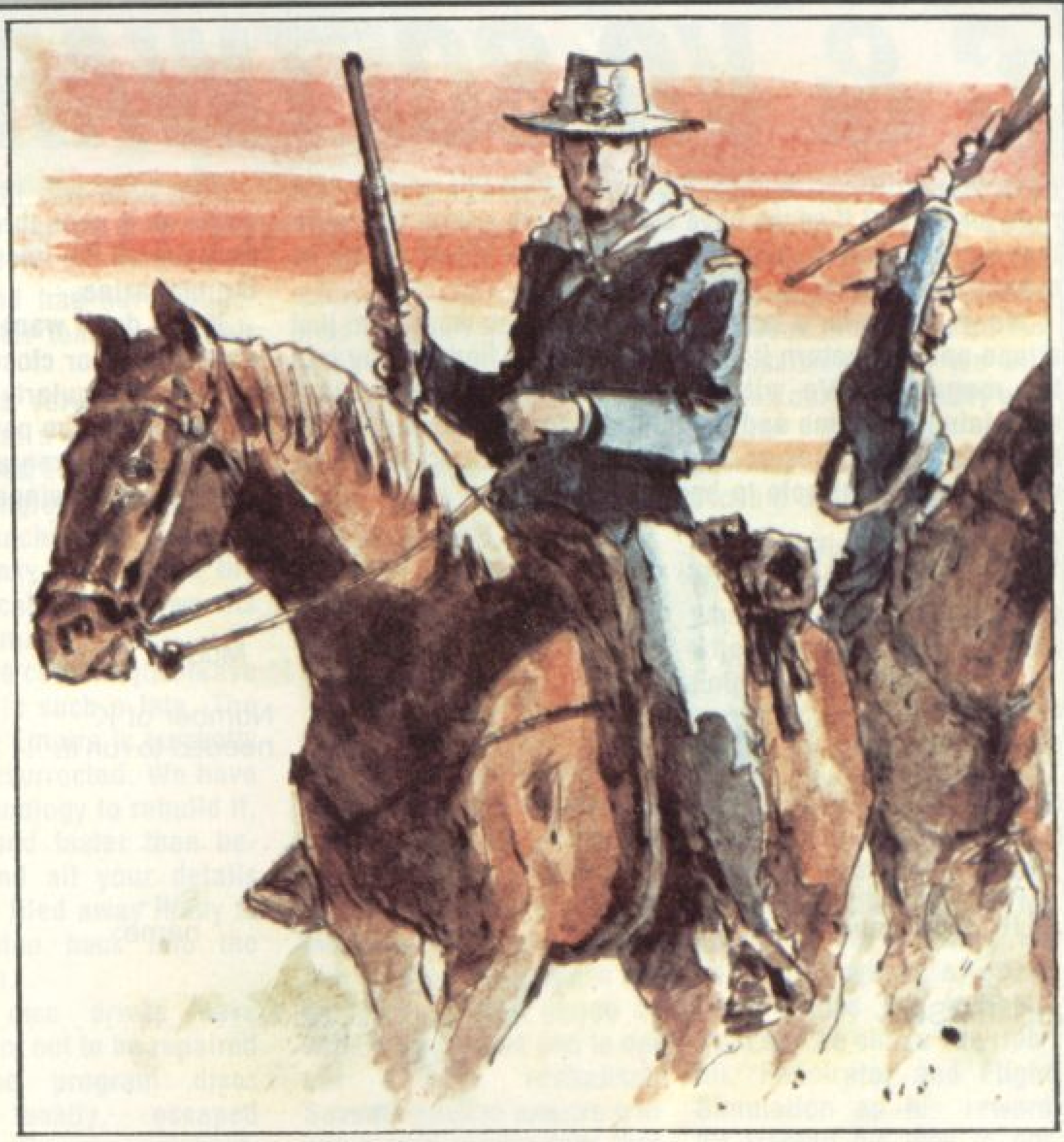


**Figure 1**

| | | |
|---|---|---|
| 540 | START | : Change sides, display number of pieces, check win by elimination. |
| 550 | PRANGE | : Get range of PTABLE index for that side. |
| 560 | INDEX | : Get location of piece, its type and moves. |
| 570 | | : Check HOLD condition — if location is negative, decrease KD — the number of pieces on HOLD. |
| 580 | DISPLAY | : Display WINDOW, Clear "FLAG" flags. |
| 590 | INPUT | : Get character and "Man in FLAG hex" flag. Prepare MV string. |
| 600 | | : Prompt for input. If a number, it's a MOVE, else if previous input was "L", goto INPUT. |
| 610 | A="L" | : If man not in FLAG hex, goto ERROR. Set LF flag, message and goto INDEX. |
| 620 | A="S" | : STOP moving that man — goto FINISH. |
| | A="C" | : CHANGE sides — goto FINISH. |
| | A="H" | : If man has not moved, negate index 0 and increase KD, number of pieces on HOLD — goto NEXT. |
| 630 | ERROR | : Print "HOW" — goto INPUT. |
| 640 | MOVE | : Is hex vacant? If HQ captured, END game.If Hex is not empty, goto ERROR. |
| 650 | UPDATE | : If FLAG has reached fort, END game. |
| 660 | | : Update IBOARD, WINDOW, BIGSCREEN and PTABLE. |
| 670 | | : If indians have captured FLAG, END game. |
| 680 | FINISH | : Is man a tomahawk? Not required to stop. |
| 690 | | : Test surrounding hex for opponents. |
| 700 | If A="C" | : Movement complete but check for HOLD. |
| | If A="S" | : Goto next piece. |
| 710 | | : Decrease MV. If moves still available, goto DISPLAY. |
| 720 | NEXT | : Increase piece index. If more pieces to move, goto INDEX. |
| 730 | | : Check for HOLD. If KD greater than zero, goto PRANGE. |
| 740 | | : Combat sequence. |
| 750 | | : Return to line 840. |

# C & VG SOFTWARE FORM

Have you written a games program which you feel is just right for C&VG? If so we have come up with a form to ensure that we can test it out and give you our views on it, as quickly as possible.

We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working, would be of great help to beginners.

This form will merely help us to keep a check on your game as it goes through our testing process and make sure we have all the information we need to present it properly in the magazine.

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on.

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

Program name: ..............................

Machine make: .............................. Model ..............................

Other models it should run on: .............................. Number of K needed to run it: ..............................

Other equipment (joysticks, Extended Basic, add ons, etc.) needed to run it: ..............................

Author's Christian name: .............................. Surname: ..............................

Address: ..............................

..............................

.............................. Tel: .............................. Date: ..............................

Type of game: (If original please say so) ..............................

Loading instructions: ..............................

Game instructions: (If not included in the listing) ..............................

..............................

..............................

**Office use only**

Date received: ..............................

Acknowledgement sent: ☐

Name of evaluator: ..............................

Date sent out: ..............................

Date due back: ..............................

Needs to be returned to author for alterations: ☐ Date sent: ..............................

Due to be published in .............................. issue of magazine.

Evaluator's comments

Good enough to publish ☐

Needs some tidying up ☐

Not worth publishing ☐

Same game already published on this micro ☐

Wouldn't load ☐

# SEVENTH EMPIRE

## THE FALL OF AN EMPIRE

THE Seventh Empire is dead. Long live the Seventh Empire! By way of an apology to readers who were planning out their next moves, we have to admit that we have had a technical hitch beyond even the Bugs' wildest imaginings.

A combination of a disc-drive error which did not back up our data properly and a power cut which scratched out our current data disc meant that our files on the game are now hopelessly out of date.

Although we can laugh about it now, coming in on press day to find the mess that used to be a flourishing galaxy winking out error messages when it should have been neatly processed and ready to print out the results, almost reduced a half-grown staff-writer to tears and had our production editor tearing his hair out.

It was very tempting to write that a previously unmentioned black hole which Mike Singleton had placed in an uncharted region of the Galaxy had sucked the whole caboodle down its eternal maw.

But we couldn't just leave you all to such a fate. The Seventh Empire is currently being resurrected. We have the technology to rebuild it, better and faster than before. And all your details are still filed away ready to be written back into the program.

The disc drives have been sent out to be repaired and the program discs have, luckily, escaped damage. So we are currently trying to ensure that the Seventh Empire will rise from the ashes of its former self.

It will mean that we'll have to send out new fleet positions, but we hope that you'll bear with us, put the first three turns down to experience and join in the triumphant re-launch of the Seventh Empire in our next available issue.

A final note: I know a couple of people have phoned up saying that for one reason or another they have had to give up the Seventh Empire commitment. We do have a lot of other readers who would like to take your place in the game, so please phone or write if you would like to opt out of the revitalised Seventh Empire and we will put a new reader into that slot.

A special apology goes out to our last top 10 players in April who were pulling ahead in the race for the Colecovision prize. We will scratch our heads to try and ensure that the new Seventh Empire takes account of their scores.

But on the positive side, we have learnt a lot about what we were taking on when we launched Seventh Empire and although it is currently a dirty word in the office, the resurrected game will benefit from that knowledge.

Our thanks go to Psion and Melbourne House for providing the software for our April winner's prize. David Jones has a Spectrum and he chose The Hobbit, Penetrator and Flight Simulation as his reward for trading his way to our top April score.

# REVIEWS

## MIGHTY KONG BEATS OFF ANNOYING BUGS

### KRAZY KONG

Take an ape, a blonde starlet and a cute little carpenter called Mario and you've got the three vital ingredients of Donkey Kong one of the latest hit arcade games.

Most video games players will know the format backwards but for the uninitiated the plot is a simple one. The ape has grabbed your girl and taken her to the top of a steel fortress. You must climb the fortress and rescue her, avoiding barrels which the great hairy beast is showering you with from above.

After the first few attempts at playing Interceptor Micros version for the unexpanded Vic-20 this game appeared to have more bugs than a flea-bitten old moggy. It took me quite a few games to learn how to get started.

All the action takes place on one screen — as opposed to the three screens of the Nintendo original.

I was disappointed that the ape cannot be made to crash to the ground as he does in the arcade version when you reach the top level. When you get to the top you simply kiss the girl to rescue her, clock up a few bonus points, and then you must start all over again — but at a faster pace.

The bugs mentioned above occur mainly at the beginning of the game. To get started you must jump onto an elevator which takes you to the bottom of the steel fortress.

If you jump at the wrong moment you may find half of your body left behind. Or, when you do get to the bottom of the fortress having jumped off the elevator safely you may find yourself wading through the first level instead of walking along it.

Another thing that could have been improved was the long delay after being hit by one of the barrels. I found myself constantly bashing the repeat button in sheer frustration.

On the graphics side Krazy Kong scores highly for the unexpanded Vic. The ape and girl were both believable representations even if Mario was a little stick-like.

Converting Donkey Kong to the unexpanded Vic was an ambitious project which many other software houses have not attempted. Interceptor Micros version plays a reasonable game despite the odd bug. It is available from the Tadley, Hants. based firm at £6.95.

- **Getting started** 9
- **Value** 6
- **Playability** 6



## GIVE THESE GUARDS THE BRUSH OFF!

### SUPER GLOOPER

Paint the numerous corridors of a maze and dodge the aliens. This is the challenge you face in the new ZX81 game from Psion called Super Glooper.

There are five different mazes to choose from, and unlike the numerous Pacman-type games now on sale, you do not have to gobble dots, but colour the maze in as you move the Glooper around.

To make things a little bit more difficult there are four guards, represented by inverse 'A's, who try to catch you.

To help you deal with the guards there are four shields — represented as ':'s in the four corners of the maze. When you paint over these they turn the guards into inverse 'X's and you can then kill them off.

On the B-side of Super Glooper is a bonus game based on the popular arcade game Frogger.

Frogs is based on the second stage of the arcade version in which you must get your frog across a river by hopping from log to log. There are nine levels of play.

Super Glooper and Frogs are available from most large branches of W.H. Smith at £4.95, running on the ZX81 with 16K RAM.

Two good quality machine code games have got to make this cassette another winner for Psion.

- **Getting started** 8
- **Value** 9
- **Playability** 9

Illustration: Jon Davis

# REVIEWS

## A SMART, BUT EXPENSIVE, BUNCH OF ALIENS

### DEFENDER

If there is one game that sorts the men out from the boys in the video games talent stakes it is Defender.

When it first hit the arcades in the late seventies many a Space Invaders star could be seen walking away from the machine seconds after inserting the coins muttering something like "Too tough for me" or "Perhaps it's time to hang up my joystick and get an allotment".

Many video games enthusiasts didn't even bother to give Defender a try at first, being frightened off by the numerous controls.

If you were one of those people then you now have a second chance to master this classic game as it has just been converted for the Atari 400 and 800 home computers.

Your mission is to rescue the humanoids from the aliens who are swarming down to abduct them.

Five types of aliens have to be dealt with in this fast action shoot-out. The Landers are the first to appear and attempt to kidnap the humanoids. If they succeed and take the humanoids to the top of the screen they turn into extremely dangerous Mutants.

Swarmers track you closely and must be destroyed at the first available opportunity. Still nastier are the Pods which, when destroyed, release several Swarmers.

Bombers lay mines to trap you — which cannot be shot. Baiters are saucer like ships which appear if you are judged to take too long in eliminating all the aliens in a particular sector.

Your Defender ship is armed with a powerful laser which is most effectively used by keeping a close eye on the radar which shows you where to fire to pick off the oncoming aliens.

Two more controls are at your disposal if things are getting a little bit hectic. The hyperspace button, which in this case is the Atari's keyboard space bar, makes you momentarily disappear and replaces you at random on the screen.

Slightly safer than hyperspace is the Smart bomb button which you can utilise by pressing any individual letter key. This will wipe out all the aliens on the screen when detonated.

Be warned about smart bombs. You only have three of them and the skilled Defender player uses them carefully and selectively.

All ship movements and the laser are controlled with the joystick making this home version considerably easier to master than the arcade game.

Graphics-wise the Atari Defender is fair, although not outstanding. It was not always clear when you had been hit, making you pause for a some times fatal split second.

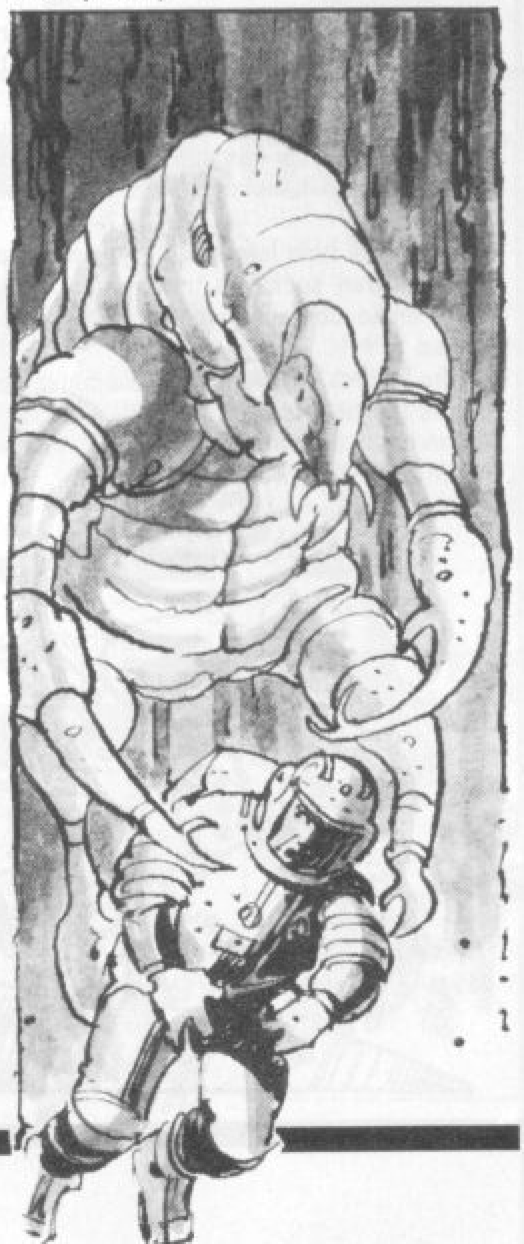
Other gripes were with the Smart bombs. It is sometimes difficult to find a spare finger to depress the space bar as you need two hands to hold Atari joysticks. The same goes for the hyperspace buttons.

This is a reasonable conversion of a complex arcade game, although for £29.95 you may be able to buy two equally, or even more playable games for the money.

Cross-computer comparisons must be made carefully as they can quite often be erroneous.

You must compare like with like in terms of price and also in terms of the claims made for the machines by the manufacturers. A useful conclusion can therefore be drawn in the wake of this Defender review between the Atari 800 and BBC model B and that is that for the games player, software for the BBC machine is both cheaper and of a better quality despite the fact that both computers fall into the same price band.

- **Getting started** 9
- **Value** 6
- **Playability** 6



# REVIEWS

## WELL, IT'S A VERY GOOD IDEA, BUT. . .

### SCHIZOIDS

Spectrum Schizoids is one of the best ideas for a game to arrive on the *C&VG* reviews desk for several weeks.

You are at the wheel of an intergalactic Space-Dozer charged with the unfortunate task of having to bulldoze refuse from all over the galaxy into a black hole.

Your dozer can be made to thrust forward, rotate left and right and 'flip' — which has the effect of turning the machine instantly through 180 degrees to face in the opposite direction.

The controls for the dozer are very much in the style of asteroids — and indeed the space refuse comes at you from all four corners of the screen in Asteroids-fashion.

The space debris spirals towards you in three dimensional geometric shapes. There are cubes, diamond shapes, hexagons, rectangles and bars and all in different shapes and sizes.

One of the strongest features of Schizoids is the three dimensional movement of the shapes.

The dozer itself is quite difficult to manoeuvre and will take you a lot of practice to master it.

As you drift around the screen, drift because the dozer has inertia, you must be careful not to tumble into the black hole yourself.

The black hole has a slight gravitational pull and can suck you down even if you don't make contact with any of its spike edges.

The secret of shunting the shapes towards the hole is to make sure you catch them head on with your shovel. If they touch the side of your vehicle they will explode it.




Despite an excellent idea and clever programming with good graphics, I did feel that the playability of the game left a little to be desired.

It is very difficult to move the pieces of debris and control the dozer at the same time. Furthermore, the debris has a tendency to stick to the dozer's shovel, or get entangled in the skyhook at the rear. With a little bit more care a good idea could have been turned into a really good game. What we are left with is an average game but not quite up to the standard of Arcadia, and not up to the high standard we have come to expect from Imagine software.

The game runs on a Spectrum in 16 or 48k and is available at £5.50 from the Liverpool-based firm.

- **Getting started** 9
- **Value** 6
- **Playability** 6

## RAPID RODENTS WILL RUN YOU RAGGED!

### CYBER RATS

Rats, rats, rats! Yes, there will be a lot of cursing in Spectrum owning households once they get their hands on Silversoft's latest release — called Cyber Rats.

You are presented with a field full of the "meanest metallic menaces" ever let lose to plague mankind. They dash around the screen swarming down at your exterminator. They can hide behind clumps of grass which block your fire as they rush down at you. There's also the deadly purple rats which head downwards faster.

Once you finish off one wave of the rapid rodents another bunch spring out to do battle. If one catches you at the bottom of the screen its' bite will finish you off.

You can move up and down the screen to fight off the approaching rats as well as left and right — but watch out for sneaky rats catching you unawares in the maze-like grass clumps.

This reviewer had to make do with the keyboard control option to play the game but it is also joystick compatible.

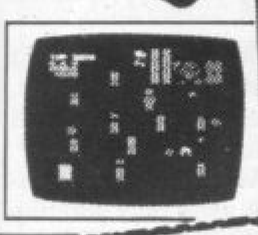
The tape loaded first time and comes with a good set of instructions — the only thing that baffled me for about five minutes was the fact that the instructions didn't say which key to use as the "fire" button.

I'm sure that the game would be even better with a joystick.

Cyber Rats comes from Silversoft of London and sells at around £5.

- **Getting Started** 9
- **Value** 8
- **Playability** 8





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# Software City

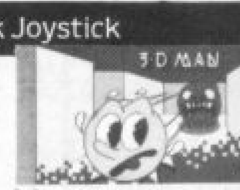
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# MACHINE CODE

## TERMINOLOGY PROCESSORS

The three processors, 6502, 6809 and Z80 have some addressing modes in common, but the terminology differs, and each has some addressing modes that are not available on the others.

*6502 Addressing Modes*

**Implied Addressing:** The operand is implicitly specified in the instruction, for example, CLC — clear the carry flag, or INX, — increment the number in the X register.

**Immediate Addressing.** The operand is contained in the instruction, for example LDX # 0 — load the X register with the number 0, or ADC # 2 — add the number in the accumulator, the number 2, and the carry, leaving the answer in the accumulator.

Because all the registers in the 6502 are 8-bits long an immediate operand must be an 8-bit number, 0 to 255 decimal, or 0 to FF hex.

**Absolute Addressing:** The 16-bit address of the operand is contained in the instruction, for example INC $1234 — increment the number in memory location $1234, or STA $1234 — put the number in the accumulator into memory location $1234.

**Zero Page Addressing:** The operand contained in the instruction is an 8-bit address which is an abbreviation for a 16-bit address in the range $0000 to $00FF, i.e. an address with high byte 0.

For example, INC $70 — increment the number in memory location $0070, or STA $70 — put the number in the accumulator into memory location $0070. Zero Page instructions occupy two bytes instead of the three bytes required in absolute addressing and take less time to execute, so by using addresses in Page Zero to store frequently used variables a program can be made significantly shorter and faster.

**Accumulator Addressing:** The operand is the accumulator, A. This addressing mode is only available with the four instructions ROL A, ROR A, ASL A, LSR A.

**Relative Addressing:** This is only used with the conditional branch instructions. The operand is a signed 8-bit number which is added to the current address to give the destination address when the branch takes place.

**Absolute Indirect Addressing:** This may be used only with the jump instruction JMP, and in assembly language this addressing mode is indicated by placing brackets around the address.

An assembly language instruction generally consists of two parts, the operation code (opcode for short), and the operand.

We have looked at several types of instruction, but so far we have been more concerned with what the instructions do (the opcode) than with how the processor obtains the numbers to operate on (the operand).

The various forms, by which an operand may be specified are called *addressing modes*, and writing efficient machine code programs requires an understanding of all the addressing modes and the circumstances in which to use them.

Here I explain the workings of the addressing modes of the 6502, 6809 and Z80.

The instruction contains a 16-bit address, and the effective address is contained in the memory location indicated in the instruction and the next higher memory location.

For example, suppose we have $00 in memory location $1234 and $10 in memory location $1235.

The instruction JMP ($1234) would then cause the processor to continue execution from address $1000. Note that, as with all 16-bit addresses on the 6502, the address is stored with the low byte before the high byte.

## READING IN MEMORY

**Indexed Absolute Addressing:** The operand in the instruction is a 16-bit address, and the effective address is obtained by adding the contents of the X or Y register to the address in the instruction.

The assembly language form for the operand is *address*, X or *address*, Y.

For example, if the X register contains $20 the instruction LDA $1234, X will load the accumulator with the contents of memory location $1234+$20=$1254, and if the Y register contains $E0 the instruction STA $1234, Y will put the contents of the accumulator into memory location $1234+$E0=$1314.

This addressing mode allows us to read tables stored in memory by giving the start address for the table in the instruction and varying the X or Y register to access different entries in the table.

**Indexed Zero Page Addressing:** This works in a similar way to Indexed Absolute Addressing, but requires only an 8-bit Zero Page address.

However, the effective address is always in Page Zero. For example, if the X register contains $E0 the instruction LDA $40, X will load the accumulator with the contents of memory location $0020, not $0120.

Although Zero Page, X addressing may be used with several instructions, Zero Page, Y addressing can be used only with the opcodes STX and LDX.

**Indexed Indirect Addressing (pre-indexing):** This can be used only with the X register. The instruction contains a Page Zero address, and the contents of the X register are added to this Page Zero Address (ignoring any carry, so the result is always a Page Zero address), and the effective address is the contents of this new Page Zero address and the next higher address.

The assembly language form for the operand is (address, X). For example, if the X register contains $E0, address $0020 contains $00, and address $0021 contains $10, the instruction STA ($40, X) will store the contents of the accumulator in address $1000.



**Indirect Indexed Addressing (post-indexing):** This can be used only with the Y register. The instruction contains a Page Zero address and the effective address is obtained by adding the contents of the Y register to the 16-bit address contained in the specified Page Zero address and the next higher address.

The assembly language form for the operand is (address), Y. For example, if the Y register contains $E0, address $0020 contains $34 and address $0021 contains $12, the instruction LDA ($20), Y will load the accumulator with the contents of memory location $1234+$E0=$1314.

Note the difference between the last two addressing modes. In indexed indirect addressing the indexing is performed first, and then the indirection; while in indirect indexing the indirection is performed first, and then the indexing.

BY TED BALL

# ADDRESSING THE 6809 CHIP

*6809 Addressing Modes*

**Inherent Addressing.** The operand is implicitly specified in the opcode, for example, CLRA — set the contents of accumulator A to zero, or ABX — add contents of accumulator B to contents of Index Register X, leaving the result in X.

**Immediate Addressing:** The operand is included in the instruction. There are two types of immediate addressing.

In the first type the operand is a constant, for example, ADDA #$20 — add the constant 20 hex to the contents of accumulator A, leaving the result in A, or LDU #$1234 — load User Stack Pointer U with the constant 1234 hex.

The constant must be of the same length as the register specified in the opcode — 8 bits for an 8-bit register or 16-bits for a 16-bit register.

In the second type of immediate addressing the operand is one or more registers, for example, TFR A, B — transfer the contents of accumulator A to accumulator B, or EXG X, Y — exchange the contents of Index Register X with the contents of Index Register Y.

**Extended Addressing:** The 16-bit address of the operand is included in the instruction. For example, LDB $1234 — load accumulator B with the contents of memory location 1234 hex, or STX $1234 — store the contents of Index Register X in memory locations 1234 hex and 1235 hex. 16-bit addresses and data are stored in memory with the high byte first, followed by the low byte, so in the previous example, if X contained $1000, $10 would go into address $1234 and $00 would go into address $1235.

**Direct Addressing:** The low byte of the address of the operand is included in the instruction, and the high byte of the address of the operand is provided from the Direct Page Register, DP.

For example, if DP contains $00 the instruction LDA $34, will load accumulator A with the contents of address $0034, while if DP contains $12, LDA $34 will load A with the contents of address $1234.

A standard 6809 assembler will normally assume that DP contains zero, but this can be changed by using the directive SETDP, which takes an immediate operand.

SETDP does not generate a machine code instruction; it is an instruction to the assembler to use direct addressing whenever the high byte of an extended address is equal to the value given in the SETDP directive.

Thus, if we include SETDP $12 in an assembly language program, and later have the instruction LDA $1234, the assembler will provide the two byte direct page form of the instruction instead of the three byte extended form.

Instead of using SETDP we can cause the assembler to provide a direct page instruction by writing < in front of the operand.

Thus, LDA <$1234 will produce the two byte direct page instruction. Similarly, writing > in front of the operand will cause the assembler to produce the three byte extended form of the instruction.

Thus, if we have not used a SETDP directive, LDA >$34 will produce a three byte machine code instruction equivalent to LDA $0034, while if we previously had a directive SETDP $F0, LDA >$34 will produce a three byte machine code instruction equivalent to LDA $F034.

In order to get a specified value into the Direct Page register we have to use a TFR or EXG instruction: there is no straightforward load instruction for DP. For example we could write:

```
LDA#$12orLDA#$12
TFR A, DP    EXG A, DP
```

**Table 1: 6809 Indexed and Indirect Addressing Modes**

| Type | Form | Non-indirect | | + Cycles | + Bytes | Indirect | | + Cycles | + Bytes |
|---|---|---|---|---|---|---|---|---|---|
| | | Assembler Form | Post-Byte Op-code | | | Assembler Form | Post-Byte Op-code | | |
| Constant Offset from R | No Offset | ,R | 1RR00100 | 0 | 0 | (,R) | 1RR10100 | 3 | 0 |
| | 5-Bit Offset | n,R | 0RRnnnnn | 1 | 0 | | Defaults to 8-bit | | |
| | 8-Bit Offset | nn,R | 1RR01000 | 1 | 1 | (nn,R) | 1RR1000 | 4 | 1 |
| | 16-Bit Offset | mmnn,R | 1RR01001 | 4 | 2 | (mmnn,R) | 1RR11001 | 7 | 2 |
| Accumulator Offset from R | A — Register Offset | A,R | 1RR00110 | 1 | 0 | (A,R) | 1RR10110 | 4 | 0 |
| | B — Register Offset | B,R | 1RR00101 | 1 | 0 | (B,R) | 1RR10101 | 4 | 0 |
| | D — Register Offset | D,R | 1RR01011 | 4 | 0 | (D,R) | 1RR11011 | 7 | 0 |
| Auto increment/ Decrement R | Increment by 1 | ,R+ | 1RR00000 | 2 | 0 | | Not allowed | | |
| | Increment by 2 | ,R++ | 1RR00001 | 3 | 0 | (,R++) | 1RR10001 | 6 | 0 |
| | Decrement by 1 | ,-R | 1RR00010 | 2 | 0 | | Not allowed | | |
| | Decrement by 2 | ,--R | 1RR00011 | 3 | 0 | (,--R) | 1RR10011 | 6 | 0 |
| Constant Offset from PC | 8-Bit Offset | label, PCR | 1XX01100 | 1 | 1 | (label, PCR) | 1XX11100 | 4 | 1 |
| | 16-Bit Offset | label, PCR | 1XX01101 | 5 | 2 | (label, PCR) | 1XX11101 | 8 | 2 |
| Extended Indirect | 16-Bit Address | — | — | — | — | (mmnn) | 10011111 | 5 | 2 |

R = X, Y, U, or S    RR 00 = X    10 = U
XX = Don't Care    01 = Y    11 = S

# MACHINE CODE

## THE CORRECT DESTINATION

**Relative Addressing:** This is used with the branch instructions. The operand is a signed number (8-bits with the short branch instructions BRA, BRN, BHI, etc, and 16-bits with the corresponding long branch instructions LBRA, LBRN, LBHI, etc) which is added to the current address to give the destination address when the branch takes place.

With a short branch the destination must be between −128 and +127 bytes from the address immediately following the branch instruction, but the destination of a long branch instruction may be anywhere in the 64k address space.

**Indexed and Indirect Addressing Modes:** The 6809 has an extensive set of indexed and indirect addressing modes, summarised in table 1. Instead of giving a full explanation and examples for each one I will just give a general outline here, and we will look at these addressing modes in detail later when we come to real example programs.

The machine code form of indexed and indirect instructions consists of the opcode, followed by a post-byte (which specifies the actual addressing mode), and in some cases there is one or two additional bytes which contain a constant offset.

In assembly language the general form of an indexed operand is Q,R where R is a register name and Q is a specification for an offset. The effective address is calculated by adding the offset to the contents of the base register R.

In all cases the offset is taken as a twos complement signed binary number. Where an 8-bit operand is required the memory location indicated by the effective address is used; where a 16-bit operand is required, two consecutive memory locations are used, the first being the one indicated by the effective address.

With indirect addressing there is a further step in the calculation of the effective address. The offset is added to the contents of the base register, and the result of this addition is taken as the address of the first of two bytes whose contents form the effective address.

## LESS USEFUL CONCEPTS . . .

*Z80 Addressing Modes*

The concept of addressing modes is less useful on the Z80 than it is on the 6502 and 6809. Although the Z80 has some addressing modes with fairly general application, there are several forms of operand specification which can be used with only a small group of opcodes.

There is no generally accepted terminology or grouping and you will find different books using different names for the Z80 addressing modes and grouping the addressing modes differently.

Many Z80 instructions take an operand of the form *destination, source* and we have seen examples of this in earlier parts of the series.

The index registers IX and IY can be used in instructions which take this form of operand. In general, we can use an index register wherever we can use the register pair HL, although there are some instructions which allow HL in the operand but do not have a corresponding form with IX and IY.

Where HL appears in the operand the corresponding index register instructions replace HL by IX or IY, for example, instead of LD HL, 1000H we can write LD IX, 1000H and LD IY, 1000H or instead of LD HL, (1234H) we can write LD IX, (1234H) and LD IY, (1234H).

Where (HL) appears in the operand the corresponding index register instructions have (IX+ displacement) or (IY+ displacement). Instead of using the register contents as an address, a constant is added first and the result used as an address.

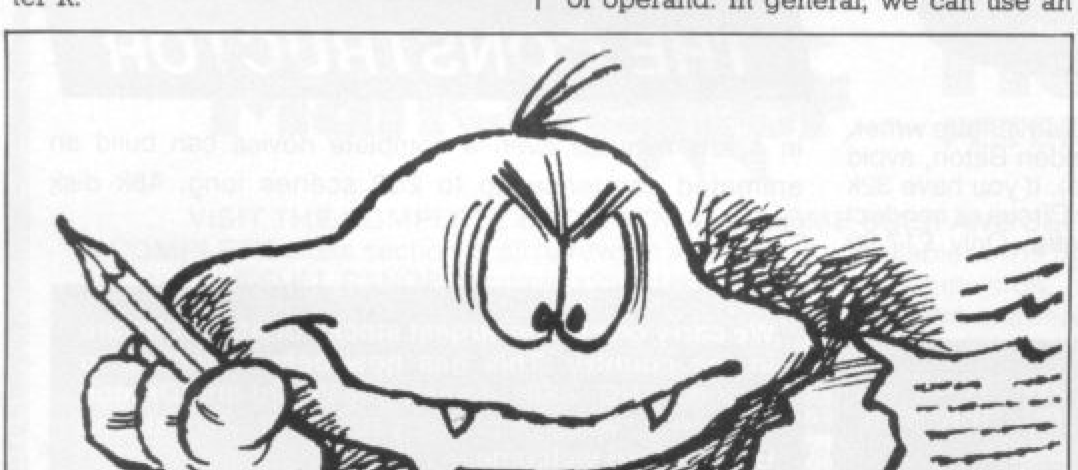
For example, if IX contained 1000H, the instruction LD A, (IX+10H) would lead the accumulator with the contents of memory location 1010H.

## EXCEPTION TO THE RULES

There is one exception to the rule that (IX+displacement) or (IY+displacement) corresponds to (HL), and this is with the jump instruction. Corresponding with JP (HL) we have JP (IX and JP (IY).

There are some exceptions to the *destination, source* form of operand. For example we have ADD A, data; ADD A, register; ADD A, (HL); ADD A, (IX+d); ADD A, (IY+d), but SUB data; SUB register; SUB (HL); SUB (IX+d); SUB (IY+d).

The assembly language requires that we specify A as the destination with an ADD instruction because we can use ADD with other registers, ADD HL, register pair; ADD IX, register pair; ADD IY, register pair; while all forms of SUB use A as the destination.



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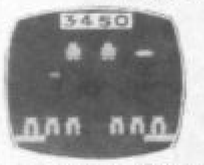
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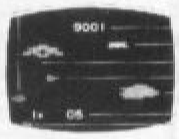
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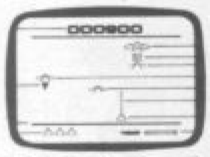
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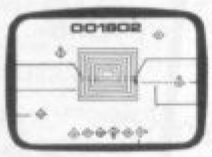
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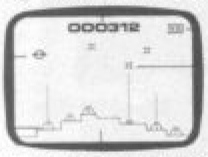
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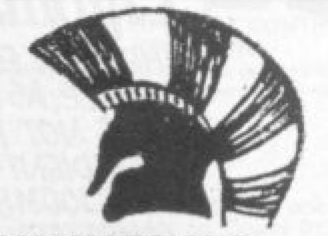
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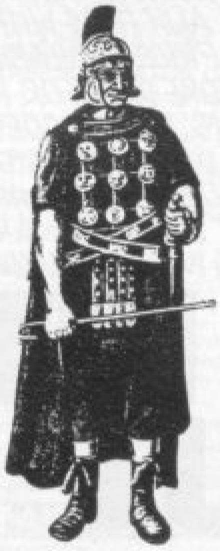
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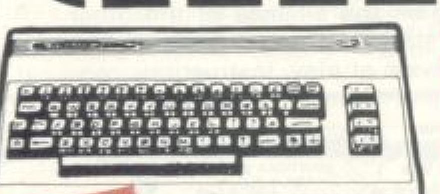
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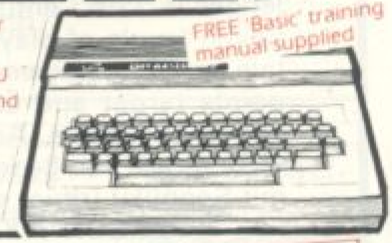
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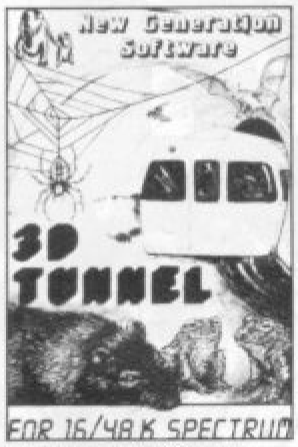


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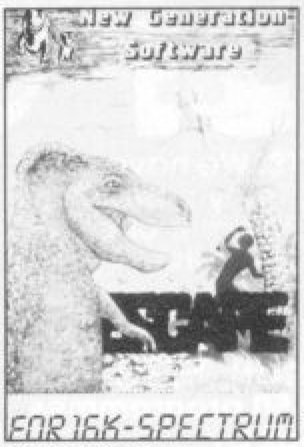
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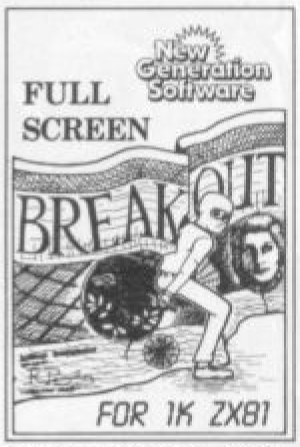

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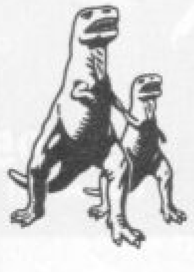



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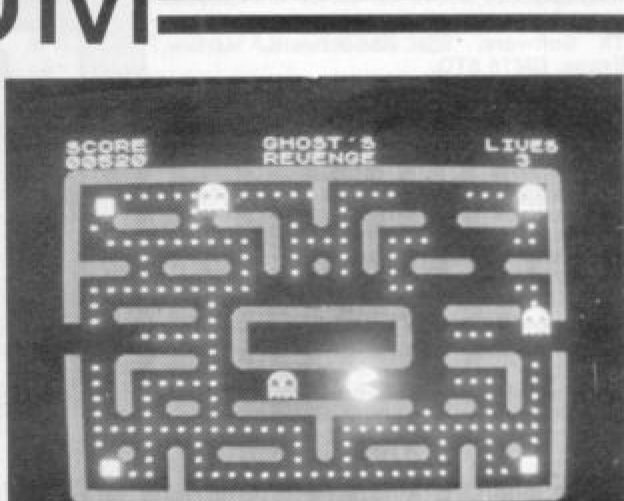
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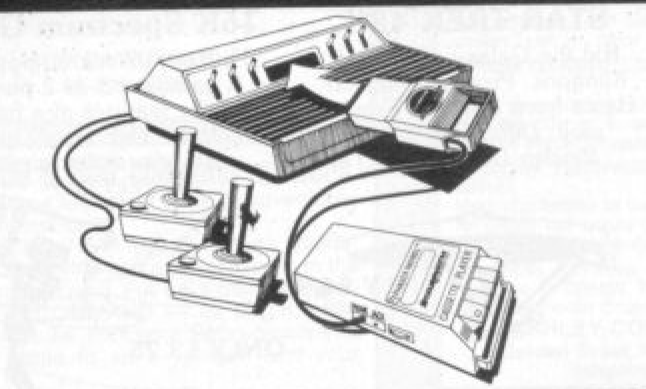
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